UNITED STATES BANKRUPTCY COURT
DISTRICT OF MASSACHUSETTS
WESTERN DIVISION

In re: ERVING INDUSTRIES, INC., et al., Debtors	Chapter 11 Case No. 09-30623 (Jointly Administered)

MEMORANDUM OF DECISION

This case presents an issue of first impression in the First Circuit: whether a creditor's supply of electricity to a debtor within the 20 days preceding the commencement of a bankruptcy case constitutes a sale of goods, entitling the creditor to a priority administrative expense claim under § 503(b)(9) of the United States Bankruptcy Code.[1]

I. FACTS AND TRAVEL OF THE CASE

Erving Industries, Inc., debtor and debtor-in-possession, together with certain of its affiliates,[2] (collectively the "Debtor") filed a voluntary petition under Chapter 11 of the Bankruptcy Code on April 20, 2009 (the "Petition Date"). On July 2, 2009, at the request of the Debtor, the Court entered an order setting August 7, 2009 as the deadline for

[1] The "Bankruptcy Code" or the "Code." Except as noted later in this memorandum, all references to code sections and numbers are to the Bankruptcy Code, 11 U.S.C. §§ 101 et seq.

[2] Namely, Erving Paper Mills, Inc., ERSECO, Inc., and Erving Realty Corp. On April 22, 2009 and October 7, 2009, this Court entered orders approving the joint administration of all four debtors' Chapter 11 cases.

creditors to file priority administrative claims under § 503(b)(9) with respect to goods delivered to the Debtor within the 20-day period preceding the Petition Date. Constellation NewEnergy, Inc. ("NewEnergy") timely submitted such a claim in the amount of $281,667.88 (the "Claim").

On September 16, 2009, the Debtor filed an objection to NewEnergy's Claim (the "Objection"), to which NewEnergy responded (the "Response").[3] The Debtor and NewEnergy agree that the amount claimed by NewEnergy accurately represents charges for electricity supplied to the Debtor during the relevant time period. But the Debtor objects to the priority asserted for the Claim under § 503(b)(9) on grounds that electricity is not a *good* covered by the relevant section of the Bankruptcy Code. This is the only issue to be decided.[4] If the Court concludes that electricity is a good within the meaning of § 503(b)(9), then NewEnergy is entitled to a priority administrative claim of $281,667.88 in the Debtor's Chapter 11 case; if the Court concludes that electricity is not a good, then NewEnergy is left with a general unsecured claim against the Debtor.

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[3] The Debtor and NewEnergy have also filed supplemental briefs. For clarity, however, any additional statements or arguments contained therein will be subsumed by the Court's reference to the "Objection" or "Response."

[4] At an initial hearing on the Objection, held to establish briefing deadlines and a further hearing date, the parties indicated that they would not be seeking an evidentiary hearing in connection with the Objection and Response. Hr'g Tr. 4:2-6, October 8, 2009. But Debtor's counsel also reserved the right to request an evidentiary hearing if necessary in the event NewEnergy's forthcoming Response contained factual averments disputed by the Debtor. 10/8/09 Hr'g Tr. 14:20-15:6. In response, the Court specifically stated that if facts were disputed, then arrangements to create an evidentiary record would be made at the next-scheduled hearing. And, if the facts were not disputed, the matter would be taken under advisement. 10/8/09 Hr'g Tr. 15:17-24. Neither party has since indicated that any factual assertions are in dispute.

II. POSITIONS OF THE PARTIES

A. Service or Sale

Section 503(b)(9) provides a priority claim for the value of goods sold to a debtor in the ordinary course of the debtor's business within the 20 days preceding the commencement date of the bankruptcy case. 11 U.S.C. § 503(b)(9). Although courts have divided on certain questions arising under § 503(b)(9), there is no doubt that § 503(b)(9) does not cover creditor claims arising from the provision of services to a debtor.

1. Debtor

The Debtor would have the Court hold that, regardless of the definition of *goods* under § 503(b)(9), NewEnergy's Claim is not entitled to priority status because NewEnergy provided a *service*. Relying on a description of the electric industry provided by the Massachusetts Executive Office of Energy and Environmental Affairs, the Debtor argues that the industry is composed entirely of service providers, which categorization includes NewEnergy.

Should the Court conclude that the definition of *goods* under Article 2 of the Uniform Commercial Code (the "UCC" or "Article 2") is applicable here, the Debtor further maintains that the Court should apply the "predominant factor test" to determine that the transactions between NewEnergy and the Debtor relate primarily to the rendering of services. The Debtor analogizes this case to Mattoon v. City of Pittsfield, 775 N.E.2d 770 (Mass. App. Ct. 2002), in which the Appeals Court of Massachusetts held that the supply of water was predominantly the provision of a service and not the sale of goods. According to the Debtor, "if water . . . is predominantly a 'service,' then it is difficult to argue that electricity is anything other than a 'service.'" Debtor's Obj. at 9.

In further support of its claim that NewEnergy provided a service, the Debtor characterizes NewEnergy as a "utility provider." And pointing to the description of utility providers in both Black's Law Dictionary and in § 366 of the Bankruptcy Code, the Debtor emphasizes that utilities are described by both as providing *services*.

Arguing in support of the Debtor at the January 12, 2010 non-evidentiary hearing on the Objection (the "Hearing"), counsel for the Official Creditor's Committee ("Committee Counsel") noted that the contract between the Debtor and NewEnergy (the "Agreement")[5] refers in several places to *service* or *services*. According to Committee Counsel, this supports the Debtor's contention that the Agreement was understood by both the Debtor and NewEnergy to be a services contract and not a contract for the sale of goods.

2. NewEnergy

NewEnergy maintains that the Debtor's characterization ignores the fact that NewEnergy does not perform the traditional service functions commonly associated with electric utilities. Describing the current partially deregulated electric industry in Massachusetts, NewEnergy differentiates between the delivery of electricity as a service and the sale of electricity as the sale of goods. While regulated utilities are still responsible for the ultimate delivery of electricity to customers, NewEnergy says it has no role in that delivery and is involved solely in the sale of electricity as a "competitive supplier." NewEnergy notes that the Debtor's arguments are ironically negated by its own practices, i.e., the Debtor pays separately to the local electric utility for delivery of electricity, and NewEnergy's invoices reflect only the charges for the electricity itself.

[5] The Agreement between Erving Paper Mills, Inc. and NewEnergy, executed in March 2008, was delivered to the Court but subsequently impounded. See, infra, n.10.

NewEnergy also disputes the Debtor's characterization of NewEnergy as a "utility provider." First directing the Court's attention to a "Chart of Massachusetts Electric Utility Providers" maintained by the Commonwealth, NewEnergy notes that it is not listed as an electric utility. In addition, NewEnergy maintains that its activities in relation to the Debtor do not fit within the traditional concept of a providing utilities, as assumed by Black's Law Dictionary and as used in § 366 of the Code, because it does not have a monopoly or exclusive service or franchise area, is not regulated by the government, and is subject to competition from a number of available alternative sources of electricity.

According to NewEnergy, the Agreement supports this analysis. While NewEnergy concedes that the Agreement contains an occasional reference to *service*, it notes that the Agreement also provides that NewEnergy is not responsible for, and in fact expressly disclaims responsibility for, the transmission and distribution of electricity to the Debtor's location; delivery responsibilities remain in the hands of the regulated local utility.

Finally, NewEnergy contends that the "predominant factor test" has no applicability under § 503(b)(9), because the test applies only in those limited circumstances when a court must characterize an entire transaction or set of transactions as either predominantly the sale of goods or the provision of services. Section 503(b)(9), says NewEnergy, does not require the claimant to demonstrate that, on the whole, its transactions with a debtor were *predominantly* for the sale of goods. Rather, § 503(b)(9) creates a priority claim for the value of *any* goods sold to a debtor in the ordinary course of business within the 20 days preceding the bankruptcy filing, even if that sale were part of a larger, predominantly service-oriented transaction. Thus, NewEnergy concludes, the predominant factor test is irrelevant, and the Court should examine only whether the electricity sold to the Debtor by

NewEnergy constitutes a sale of goods, entitling NewEnergy to a priority claim under § 503(b)(9).

B. The Definition of *Goods* under § 503(b)(9) and its Application to Electricity

In the event the Court declines to hold that NewEnergy was merely providing a service, both parties recognize that Court must determine the meaning of *goods* under § 503(b)(9), since the term *goods* is not defined in the Bankruptcy Code

1. The Debtor

Relying on the fact that the Bankruptcy Code is a federal statute, the Debtor contends that the Court should not rely on the UCC definition of *goods*, as application of the UCC to § 503(b)(9) would require reference to disparate state laws, yielding undesired non-uniformity of interpretation. Instead, the Debtor says *goods* under § 503(b)(9) should be defined with reference to the "ordinary or natural" meaning of the word. Arguing for the Black's Law Dictionary definition of *goods* as "tangible or movable personal property," Black's Law Dictionary 762 (9th ed. 2009), the Debtor distills the question to whether electricity constitutes "tangible personal property," urging the Court to adopt a meaning of *goods* as "anything that could be packaged, shipped, and dropped off at a customer's loading bay." Hr'g Tr. 4:7-15 (Jan. 12, 2010).

The Debtor contends that electricity is simply not a good because it is an intangible phenomena, the movement of electrical charges, and is devoid of physical form or attributes. The Debtor asks this Court to adopt the analysis of the court in In re Pilgrim's Pride Corp., 421 B.R. 231 (Bankr. N.D. Tex. 2009), where the court concluded that electricity is not a good under § 503(b)(9). There, the bankruptcy court applied the UCC

definition of *goods* and held that the provision of electricity was more akin to the transmission of television programming, which is widely held to constitute a service (the distribution of intellectual property) and not the sale of goods under the UCC.

Furthermore, the Debtor maintains that electricity cannot be considered a good under Article 2 of the UCC, because it is not movable at the time it is identified to the contract between the Debtor and NewEnergy, as required under the UCC definition of *goods*. Drawing upon the analysis of the Pilgrim's Pride court, the Debtor argues that by the time the electricity subject to the Agreement is "identified," i.e., measured by the electric meter, it is consumed and no longer movable. Thus, it can not be a good under Article 2 of the UCC.

2. NewEnergy

NewEnergy recommends that this Court join the majority of courts and conclude that the *goods* under § 503(b)(9) should be interpreted in accord with the definition of that term found in § 2-105 of the UCC. NewEnergy contends that the UCC definition is not only widely-used and accepted by both state and federal courts, but is also consistent with the ordinary, non-legal understanding of the term.

Looking to the UCC definition of *goods – things that are movable at the time they are identified to the contract for sale* – NewEnergy insists that electricity is a good. First, NewEnergy says, electricity is literally movable; it moves from the location where it is generated, through the transmission and distribution systems, and ultimately arrives at the customer's location. And electricity is clearly identifiable, because it is measured by the meter upon delivery. Finally, NewEnergy contends that the electricity is not only movable and identifiable, but is movable *at the time it is identified* to the contract, since it is moving

through the electric meter at the time it is measured and identified to the contract between the Debtor and NewEnergy.

But even if this Court were to reject the UCC definition of *goods*, and focus instead on the Debtor's "tangibility" requirement, NewEnergy argues that electricity *is* tangible – a tangibility made obvious from the physical (and often fatal) result obtained by touching a wire transmitting electricity. According to NewEnergy, because it can be "perceived by touch," electricity is physical, tangible property and constitutes goods not only under Article 2 of the UCC, but also under the Debtor's proposed meaning of *goods* under § 503(b)(9).

C. Relationship to § 546(c)

1. <u>The Debtor</u>

The Debtor rejects NewEnergy's interpretation of the term *goods* under § 503(b)(9) as too broad. The Debtor says that the term *goods* as used in § 503(b)(9) encompasses a limited category of things subject to reclamation under § 546(c) of the Bankruptcy Code. According to the Debtor, Congress intended § 503(b)(9) to provide an alternative remedy for creditors who would be entitled to reclamation under § 546(c) but for their inability to meet the rigorous noticing standards under that section. Since § 546(c)(2) specifically provides that creditors unable to reclaim goods under that section may nonetheless be entitled to a priority claim under § 503(b)(9), the Debtor maintains the two sections were intended to "work in tandem." The Debtor says the legislative history supports this interpretation, as both the addition of § 503(b)(9) and the revision of § 546(c) were included under the heading "Reclamation" in the public law enacting the 2005 changes to the Code.

The Debtor describes the purpose behind both § 546(c) and § 503(b)(9) as an effort by Congress to prevent debtors from "stockpiling" goods or, at the very least, providing a

priority claim for stockpiled goods when creditors are unable to reclaim them. Therefore, the Debtor would conclude that the *goods* referenced in both § 546(c) and § 503(b)(9) "must have been capable of repossession," Debtor's Reply Memo., at 3-4, and since the Debtor also contends that electricity cannot be either "stockpiled" or reclaimed, classifying electricity as a good under § 503(b)(9) is inconsistent with congressional intent.

2. NewEnergy

NewEnergy disagrees with the Debtor's use of legislative history to interpret the meaning of *goods* under § 503(b)(9). While acknowledging that Congress may have intended to create a priority claim as an alternative available to creditors who are technically unable to reclaim goods under § 546(c), NewEnergy says that nothing in § 503(b)(9) limits priority status for other creditors. In fact, says NewEnergy, other creditors providing goods that are, for practical purposes, unable to be reclaimed (such as raw materials, natural gas, and water) are nonetheless held to have sold goods within the meaning of § 503(b)(9) and have successfully asserted priority claims on that basis.

D. "Narrow" Interpretation of Priority Statutes

Relying on the Supreme Court of the United States's discussion in Howard Delivery Services v. Zurich American Insurance Co., where the Court held that the objective of equal distribution under the Bankruptcy Code militated against broadly interpreting a priority provision to cover a claim not clearly falling within the statute's terms, see 547 U.S. 651, 667-68 (2006), the Debtor urges the Court to similarly "narrowly interpret" § 503(b)(9) and to reject a "broad" interpretation that would include electricity as goods. NewEnergy, in contrast, maintains that electricity clearly falls within the definition of *goods* under § 503(b)(9) and, therefore, does not present the type of "close call" which would require the

application of the interpretive principles enunciated in Zurich.

III. DISCUSSION

Section 503(b)(9), added to the Bankruptcy Code in 2005,[6] creates a priority administrative expense claim for the value of goods received by a debtor in the ordinary course of business during the 20 days prior to the bankruptcy filing.[7] 11 U.S.C. § 503(b)(9). "Resolving the meaning of section 503(b)(9) begins with the language of the statute itself." In re Goody's Family Clothing, Inc., 401 B.R. 131, 133-34 (Bankr. D. Del. 2009) (citing Ron Pair Enters., 489 U.S. 235, 241 (1989)). It is well-settled that § 503(b)(9) does not provide priority status to claims for services rendered[8] – the statute refers only to "the value of . . . *goods*." 11 U.S.C. § 503(b)(9) (emphasis supplied).

A. Services Contract or Contract for Sales?

Regardless of which definition of *goods* governs the meaning of the term in § 503(b)(9), the Debtor contends that NewEnergy's Claim is not entitled to priority status

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[6] See Bankruptcy Abuse Prevention and Consumer Protection Act of 2005, Pub.L. 109-8, 119 Stat. 23 (April 20, 2005).

[7] Section 503(b)(9) provides:

> (b) After notice and a hearing, there shall be allowed, administrative expenses, . . . including –
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> . . .
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> (9) the value of any goods received by the debtor within 20 days before the date of commencement of a case under this title in which the goods have been sold to the debtor in the ordinary course of such debtor's business.

11 U.S.C. § 503(b)(9).

[8] See, e.g., In re Pilgrim's Pride Corp., 421 B.R. 231, 238 (Bankr. N.D. Tex. 2009); In re Circuit City Stores, Inc., 416 B.R. 531, 534 (E.D. Va. 2009); Goody's, 401 B.R. at 135; In re Deer, 2007 WL 6887241, *1 (Bankr. S.D. Miss. June 14, 2007)

because NewEnergy did not *sell* anything, but merely provided a *service*. Determining whether NewEnergy provided a service requires a brief examination of NewEnergy's role in the electric industry[9] and the terms of the Agreement between parties.[10]

"In the electric industry as it existed before restructuring, [generation, transmission, distribution, and customer services] were bundled and provided as monopoly services by electric companies, at prices fully regulated by the Department [of Public Utilities]." Mass EOEEA. But today, customers "are [ ] able to purchase generation services from entities other than their traditional electric companies," and the prices charged by those "competitive suppliers" are "not [ ] regulated by the Department." Id. Transmission, distribution, and customer services, however, "have not been opened to competition" and "continue to be provided as monopoly services by the electric companies." Id. Customers' electricity bills are itemized and separated into distribution, transmission, energy use, and other charges; customers who purchase electricity from a competitive supplier may request separate billings from the electricity supplier and the local utility company. Id.

Electricity from generation facilities (i.e., "power plants") reaches a customer's

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[9] Much of the following information can be found in the "Description of the Restructured Electric Industry" on the website maintained by the Massachusetts Executive Office of Energy and Environmental Affairs, reproduced at Appendix 1 and available at <http://www.mass.gov/?pageID=eoeeaterminal&L=5&L0=Home&L1=Energy%2c+Utilities+%26+Clean+Technologies&L2=Electric+Power&L3=Electric+Market+Information&L4=Electric+Industry+Restructuring&sid=Eoeea&b=terminalcontent&f=dpu_electric_restructuring&csid=Eoeea>. ("Mass EOEEA") (last visited April 7, 2010).

[10] Pursuant to an Order of this Court, the Agreement was filed under seal and is not available on the public docket. However, at the direction of the parties, the Court has reviewed the Agreement in reaching its decision on the issues presented here. The limited portions of the Agreement to which this memorandum refers are not those identified as proprietary or sensitive, and were in fact referred to at the hearing and in NewEnergy's Response.

location through a series of transmission and distribution lines.[11] The generators are connected to a network of high-voltage transmission lines used for transmitting electricity over long distances (the "transmission grid").[12] Restructuring Primer, at 4.1. Before entering a local utility's distribution lines, the electricity is typically passed through a substation where it is "stepped down" to a lower voltage. Id. The local utility then distributes the electricity through its lower-voltage distribution system, using transformers to lower the voltage again as the electricity comes off the distribution line and passes into the customer's home or business. Id.

NewEnergy acts as a "competitive supplier" within this framework. NewEnergy contracts with electricity generators to buy electricity. Under NewEnergy's contracts with its customers, it sells that electricity to the customer, ensuring that an adequate supply of electricity is delivered from the generating facility to the transmission grid. The customer is then responsible for contracting with the local utility to have the electricity delivered from the transmission grid to the customer's location.

Relying on the Mass EOEEA's description of the restructured electric industry, see, supra n. 9, the Debtor says that NewEnergy's role in the electric industry is one of a service provider. The Mass EOEEA does describe the electric industry in terms of services – "generation service"; "transmission service"; "distribution service"; and "customer service."

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[11] The following description was derived from W.M. Warwick, A Primer on Electric Utilities, Deregulation, and Restructuring of U.S. Electricity Markets Part 4.0 Transmission and Distribution (Version 2.0 2002) ("Restructuring Primer"), prepared by the Pacific Northwest National Laboratory for the United States Department of Energy, attached hereto as Appendix 2 and available at <http://www1.eere.energy.gov/femp/pdfs/primer.pdf> (last visited April 7, 2010).

[12] Transmission of energy over a large network is accomplished more efficiently by raising the voltage and using high-voltage transmission lines.

See Mass EOEEA. But the Debtor's conclusion that the whole of the electric industry is thus comprised only of service providers takes the Mass EOEEA's description out of context and places undue emphasis on its terminology.

Regardless of the Mass EOEEA's general description of the electric industry as one involving various services, that description is apt only to the extent that it *actually* describes the nature of NewEnergy's transactions with the Debtor. The Mass EOEEA's discussion is intended to educate the general public and to help customers better understand electric industry deregulation in Massachusetts. It does not purport to reach any conclusive legal characterizations relevant to the industry. Thus, to the extent that it describes activities as *services* as opposed to *sales* it is not, standing alone, particularly persuasive.

While the Mass EOEEA indicates that some entities provide "generation services," NewEnergy does not independently generate electricity. It resells electricity it purchases from others. And even if the Mass EOEEA would include NewEnergy's activities under the category of "generation services," the Court would not thereby conclude that NewEnergy provides a service. Entities who "generate" things are not service providers merely because they engage in the act of generation. A farmer may be said to "generate" crops by sowing seeds, watering, weeding, and harvesting. But when the farmer takes the fruits of her labors to market, we do not say that she provides a *service* in the legal sense because she "generates" food. We say she *sells* food. Similarly, here, the Mass EOEEA may say that certain entities provide "generating services" because they generate electricity, but this is not the whole of the story. Ultimately, the electricity that is generated is *sold*. Whether or not electricity is a good, NewEnergy is in the business of selling that electricity, and not providing a *service*. See Ransome v. Wisc. Elec. Power Co., 275 N.W.2d 641, 643, 648

(Wisc. 1979) ("The distribution [of electricity] might well be a service, but the electricity itself, in the contemplation of the ordinary user, is a consumable product.").[13]

But the Debtors also say that NewEnergy must have provided a service because NewEnergy is a utility and, Black's Law Dictionary and § 366 of the Code tell us, utilities provide services.[14] NewEnergy, however, says that it is not a utility in the traditional sense, and the Court agrees. *Utility* is not defined in the Bankruptcy Code, but the term ordinarily refers to a "business organization (as an electric company) performing a public service and subject to special governmental regulations," that has "some special position with respect to the debtor," and has "a monopoly in the area so that the debtor cannot easily obtain comparable service from another." One Stop Realtour Place, Inc. v. Allegiance Telecom, Inc. (In re One Stop Realtour Place, Inc.), 268 B.R. 430, 435, 436, 437 (Bankr. E.D. Pa.

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[13] The Court is not persuaded by the reasoning in Otte v. Dayton Power & Light Co., 523 N.E.2d 835 (Ohio 1988) and the line cases from the state of New York relying on Otte, see, e.g., Bowen v. Niagara Mohawk Power Corp., 183 A.D.2d 293 (N.Y. App. Div. 1992), wherein the courts held that electricity is not a product for the purpose of imposing strict liability and, by extension, is not a good under the UCC. The basis for Otte's holding was the court's determination that electric utilities do not "manufacture" electricity, but merely allow customers to access the electric company's service. The court was persuaded by its impression that charges for electricity by the kilowatt hour represents a measurement of time. 523 N.E.2d at 839. It is this Court's understanding, however, that the kilowatt hour measurement incorporates both quantity and duration of use. An actual "kilowatt of demand" measures the amount of electricity used at a specific point in time, while the kilowatt hour integrates both the quantity of electricity and the duration. Although actual consumption of electricity can be measured, the use of the kilowatt hour enables electric companies to "integrate demand and duration." See Restructuring Primer, Glossary, at A.23-24, reproduced at Appendix 3 and available at <http://www1.eere.energy.gov/femp/pdfs/primer.pdf> (last visited April 7, 2010). Thus, the use of a time element in measuring electricity consumption does not lead the Court to conclude that customers are merely taking advantage of a service over a particular period of time. Rather, the customers, in this Court's view, are being charged for actual electricity consumption.

[14] See Black's Law Dictionary 1666 (a "utility provider" is "a company that performs an essential public *service*"); 11 U.S.C. § 366 (referring to "service" in connection with a "utility," for example, "a utility may [or may not] alter, refuse, or discontinue *service*"; "a debt owed by the debtor to such utility for *service*") (emphasis supplied).

2001); see also Darby v. Time Warner Cable, Inc. (In re Darby), 470 F.3d 573, 575 (5th Cir. 2006).

NewEnergy is not subject to governmental regulation as are traditional utilities and the local utilities that continue to provide transmission, distribution, maintenance, and customer services in Massachusetts. See Mass EOEEA. And NewEnergy does not enjoy a "special relationship with the Debtor," because alternative sources of electricity are available to the Debtor; the Debtor could choose to obtain its electricity from the local electric utility company or from a variety of other competitive suppliers. See, Darby, 470 F.3d at 575 (where debtor could obtain alternative cable service with minimal inconvenience, cable company was not "utility" within the meaning of § 366). Most telling, perhaps, is the fact that the Mass EOEEA does not list NewEnergy among those entities classified as "utilities" in the Commonwealth. See "Massachusetts Public Utility Service Providers (Electricity)," reproduced at Appendix 4 and available at <http://www.mass.gov/mgis/elec08.jpg> (last visited April 7, 2010).[15]

The conclusion that NewEnergy was not providing services to the Debtor is further supported by the terms of their Agreement. The Agreement's very title – Master Electricity *Supply* Agreement – indicates that it is a contract governing the sale of electricity and not the provision of a service. The Agreement consistently refers to the Debtor's "purchase"

[15] Even if the Court were to determine that NewEnergy is a utility, that characterization would not foreclose NewEnergy's claim under § 503(b)(9). See, e.g., Pilgrim's Pride, 421 B.R. at 241 (nothing in the Bankruptcy Code forecloses a utility under § 366 asserting a priority claim under § 503(b)(9)); In re Plastech Engineered Prods., Inc., 397 B.R. 828, 839 (Bankr. E.D. Mich. 2008) (rights under § 503(b)(9) are not limited by § 366 or the availability of any other remedies under the Bankruptcy Code).

and NewEnergy's "sale" of electricity.[16] And where the Agreement speaks of *service* or *services*,[17] the usage is loose. When read in context, the references to *service(s)* in the Agreement are generic, in much the same way as the Mass EOEEA generically refers to *generation services* when actually speaking of both the generation and sale of electricity.[18]

For all of these reasons, the Court concludes that NewEnergy's Claim does not arise from services provided to the Debtor, but solely from the sale of electricity. The only question remaining is whether that electricity constitutes a good under § 503(b)(9).

B. Defining *Goods* under § 503(b)(9)

The term *goods* is not defined in the Bankruptcy Code, and the Court must first determine what framework should be applied for assessing whether a thing is or is not a good under § 503(b)(9). The Debtor urges the Court to adopt a "common" understanding of the term, directing the Court's attention to the definition of *goods* contained in Black's Law Dictionary – "tangible or movable personal property." Black's Law Dictionary 762 (9th ed.

[16] The Agreement's introductory paragraph states that it is to "govern transactions for the *purchase and sale* of electricity and related services to be entered into between the Parties from time to time. . . . [other parts of the Agreement] shall set forth . . . terms for the *purchase* and *sale* of electricity . . . ." Further references are found, *inter alia*, in paragraphs 1 (NewEnergy "shall *supply*" and Customer "shall *purchase*" electricity); T2.6.(b) ("Customer is entering into this Agreement to *purchase* its electric energy", "electric energy *purchased* under this Agreement"); and T2.13. (Customer's "*purchase* of electricity") (emphasis supplied).

[17] For instance, paragraph 1 provides that certain portions of the Agreement could specify *services* to be provided. Other references to *services* are found, for example, in paragraphs T2.4. (referring to customer accounts *served* by New Energy, the provision of *service*, and providing *service* to the Customer); T2.12. (goods and *services* received); and PS2.1. (NewEnergy will begin *service* or commence *service*) (emphasis supplied).

[18] NewEnergy's intermittent reference to its *services* provided to the Debtor are no more dispositive on the legal question than, for instance, a company supplying bottled water referring to its business as a "water delivery service" – legally, such a characterization would not change the fact that the company is actually *selling* bottled water.

2009). While "[i]n the absence of either a built-in definition or some reliable indicum that the drafters intended a special nuance, accepted canons of construction teach that the word should be given its ordinary meaning," which definition may include its "accepted dictionary definition,"[19] it is also a "'well established' principle that '[w]here Congress uses terms that have accumulated settled meaning under . . . the common law, a court must infer, unless the statute otherwise dictates, that Congress means to incorporate the established meaning of these terms.'"[20] This is especially true in the context of the Bankruptcy Code. See Goody's, 401 B.R. at 134 ("When Congress amends the bankruptcy laws, it does not write 'on a clean slate.'") (quoting Dewsnup, 502 U.S. at 419).

Given the wide usage and acceptance of the definition of *goods* found in the UCC at § 2-105(1), it is hardly plausible that Congress expected bankruptcy judges to roll up their sleeves and set to work re-inventing the proverbial wheel and divining a more amorphous "common understanding" of the term. Instead, this Court concludes (as have most, if not all, courts addressing the issue), that the meaning of *goods* under § 503(b)(9) is primarily informed by the meaning of *goods* under Article 2 of the UCC. As the bankruptcy court in In re Goody's observed:

> Use of the UCC Article 2's definition of "goods" in interpreting section 503(b)(9) is suggested in a leading treatise and has been adopted by

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[19] SEC v. Tambone, – F.3d –, 2010 WL 796996 (1st Cir. March 10, 2010) (discussing the meaning of the word "make" as used in 17 C.F.R. § 240.10b-5(b)), (citing Smith v. United States, 508 U.S. 223, 228 (1993); Santa Fe Indus., Inc. v. Green, 430 U.S. 462, 472 (1977); In re Hill, 562 F.3d 29, 32 (1st Cir. 2009)).

[20] Nationwide Mut. Ins. Co. v. Darden, 503 U.S. 318, 322 (1992) (quoting Cmty. for Creative Non-Violence v. Reid, 490 U.S. 730, 739-40(1989)); see also Dewsnup v. Timm, 502 U.S. 410, 419 (1992); Standard Oil Co. of N.J. v. United States, 221 U.S. 1, 59 (1911); Circuit City, 416 B.R. at 535; In re Modern Metal Products Co., 2009 WL 2969762, *1 (Bankr. N.D. Ill. Sept. 16, 2009); Goody's, 401 B.R. at 134.

> bankruptcy courts examining this issue. Given the near unanimous nationwide adoption of Article 2 of the UCC, the Court concludes that the term "goods" in section 503(b)(9) conforms with the meaning given in U.C.C. § 2-105(1) . . . ."

401 B.R. at 134.[21]

This approach also fosters uniformity. As noted above, each of the states, with the exception of one, has adopted the Article 2 definition of *goods*. And because the UCC definition has permeated our legal conception of *goods*, it also "is the definition on which sellers have come to rely in their transactions and is the 'well-known' meaning." Circuit City, 416 B.R. at 535-37.[22] Thus, this Court joins the majority of others and concludes that the appropriate meaning of *goods* under § 503(b)(9) corresponds with the meaning given to that term in § 2-105(1) of the UCC.[23] Nevertheless, out of an abundance of caution, this Court

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[21] See also Circuit City, 416 B.R. at 535-37; Modern Metal, 2009 WL 2969762, at *1; Plastech, 397 B.R. at 836; In re Samaritan Alliance, LLC, 2008 WL 2520107, at *3 (Bankr. E.D. Ky. June 20, 2008); Deer, 2007 WL 6887241, at *1-2; cf. Semcrude, 416 B.R. at 405 (other undefined terms in § 503(b)(9) should also be defined by reference to UCC Article 2).

[22] The Court further agrees that the UCC definition is "consistent with the ordinary, 'non-legal' meaning of the word," and the adoption of the Debtor's proposed "alternative" definition would have no difference to the outcome in this case. See, e.g., Pilgrim's Pride, 421 B.R. at 236 n.4; Goody's, 401 B.R. at 134.

[23] The Court remains mindful, however, that § 503(b)(9) is federal law. As such, the definition of goods is also matter of federal, and not state, interpretation. Although the Court has not identified any state laws which deviate from the definition of *goods* found in § 2-105, see Local Code Variations, Anderson U.C.C. § 2-105, at 95-100 (2009 ed.), the Court agrees with the court's conclusion in Pilgrim's Pride that "the appropriate definition of goods for the purpose of Code § 503(b)(9) is that found in the 'model' UCC," 421 B.R. at 236-37, and not any particular permutation adopted by an individual state. Of course, decisions interpreting the meaning of *goods* under § 2-105 will provide bankruptcy courts with a wealth of persuasive and insightful guidance. But to the extent that differences arise from "local enactments of the UCC or the variances in its interpretation by the courts of the states," the Court agrees that federal bankruptcy courts should be reluctant to give those variances effect under federal law. Id.; cf. United States v. Hext, 444 F.2d 804,807-810 (5th Cir. 1971) (interpretation of federal statute involving secured transactions under the federal FHA loan program, while requiring a "uniform federal interpretation," is guided by relevant portions of the UCC, since the UCC Article 9 is " the principal fount of general commercial law governing secured transactions").

will also address the definition of *goods* which the Debtor urges be employed.

C. Whether Electricity is a *Good* under § 503(b)(9) of the Bankruptcy Code

1. What is Electricity?

> *. . . a form of energy occurring in two modes (positive and negative) as an intrinsic property of electrons and certain other subatomic particles, and produced as a flowing current when a conductor such as a copper wire is moved through a magnetic field.*
>
> \- The Oxford English Dictionary[24]

> *It is important to realize that in physics today, we have no knowledge of what energy* is. *We do not have a picture that energy comes in little blobs of a definite amount. It is not that way.*
>
> \- Richard P. Feynman[25]

> *. . . I give the experimentalist's answer to the very fundamental but very familiar query: "What is electricity?" His answer is naive, but simple and definite. He admits at once that as to the* ultimate *nature of electricity he knows nothing*.
>
> \- Robert A. Millikan[26]

In some ways, the issue before the Court requires the impossible – the explication of electrical energy, when even great physicists tell us its essential nature remains unknown.[27] Luckily, although the precise nature of energy continues to elude us, the basic

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[24] OED Online (Oxford University Press, Mar. 2010), available at <http://dictionary.oed.com/cgi/entry/50072994> (last visited April 7, 2010).

[25] Richard P. Feynman, "Conservation of Energy", in Six Easy Pieces: essentials of physics explained by its most brilliant teacher 71-72 (Basic Books 1995).

[26] Robert A. Millikan, Nobel Lecture: The Electron and the Light-quant from the Experimental Point of View, at 55 (May 23, 1924), available at <http://nobelprize.org/nobel_prizes/physics/laureates/1923/millikan-lecture.pdf> (last visited April 7, 2010).

[27] In some respects, this Court must admire the clarity of the following observation provided by humorist Dave Barry: *"We believe that electricity exists, because the electric company keeps*

processes of electrical energy generation and its mechanics have been discovered. See, e.g., San Diego Gas & Elec. Co. v. The Super. Ct. of Orange Co., 920 P.2d 669, 673-74 (Cal. 1996) (quoting U.S. Cong., Office of Technology Assessment, Biological Effects of Power Frequency Electric and Magnetic Fields 4 (1989)). The following rudimentary and decidedly un-nuanced description of electricity that follows may cause the more scientifically-oriented to cringe, but it is, insofar as the Court has determined, an accurate summary.

We begin with the most basic concept, the idea that "all things are made of atoms – little particles that move around in perpetual motion." Feynman, Six Easy Pieces, at 4. These atoms, in turn, are comprised of "a nucleus that has a positive electrical charge . . . together with a number of electrons, all having the same negative charge and mass, which move at distances from the nucleus."[28] Electrons moving around the nucleus on the outermost plane (or "shell") can be knocked out of orbit and move from one atom to another, taking their charge with them. It is the energy produced by this movement of electrons from atom to atom that we call "electricity."[29]

Power plants use these basic principles to create electricity by applying a force to push electrons out of their orbits and cause them to "flow" from atom to atom. For example, the force of a spinning electromagnetic rotor will move electrons out of orbit in a nearby

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sending us bills for it . . . ."

[28] Niels Bohr, Nobel Lecture: The Structure of the Atom, at 8 (December 11, 1922), available at <http://nobelprize.org/nobel_prizes/physics/laureates/1922/bohr-lecture.pdf> (last visited April 7, 2010).

[29] See U.S. Energy Information Administration, Electricity Explained, reproduced at Appendix 5 and available at <http://tonto.eia.doe.gov/energyexplained/index.cfm?page=electricity_science> (last visited April 7, 2010).

copper wire. This creates the electricity and electrical currents that move through various transmission and distribution lines and are ultimately diverted to homes and business where the electricity is put to use.[30]

How this electric current is then quantified was explained by the California Supreme Court in San Diego Gas & Electric:

> An electric current is a group of charges moving in the same direction through a wire or other conductor. *Voltage* is the difference in electric potential that causes the charges to flow through the wire . . . and is measured in volts (V) or, in the case of power lines, in thousands of volts or kilovolts (kV). *Current* is the rate at which the charges flow through the wire . . . and is measured in amperes. The quantity of power (in watts) that a conducting wire transmits is thus the product of its voltage and its current. Power systems are designed to hold the voltage relatively constant but to meet fluctuating demand by allowing the current to rise and fall.

920 P.2d at 673-74.[31]

2. Is Electricity "Tangible"?

Because the Debtor relies primarily on its articulation of the "common understanding" of *goods* to include only tangible personal property, much of its analysis focuses on the assertion that electricity is not tangible, and is therefore not a good. According to the Debtor, electricity is "simply the movement of electrical charges" and the "physical phenomena arising from the behavior of electrons and protons," but does not have actual physical form or physical attributes.[32]

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[30] The electromagnetic rotors used to create the electricity are driven in the first instance by methods such as burning fuel to produce steam or by using gas, nuclear fuel or wind.

[31] But see Otte, 523 N.E.2d at 839 (consumers "do not pay for individual electrically charged particles. Rather they pay for each kilowatt hour provided. Thus, consumers are charged for the length of time electricity flows through their systems.")

[32] The Court has identified two cases that directly refer to electricity as "intangible." In Elgin Airport Inn, Inc. v. Commonwealth Edison Co., the court referred to electricity as "intangible" without

The court in Pilgrim's Pride, 421 B.R. at 239, articulated a similar analysis, beginning with the proposition that the "UCC § 2-105 does not suggest that the provision's drafters had intended that 'goods' would include things which cannot be packaged and handled . . . things that, like manufactured goods, clearly occupy space and can be moved about . . . ." Id.[33] The court further concluded that electricity could be analogized to television, radio, telephone, and internet signals which are not considered goods under the UCC. Therefore, that court concluded, electricity should also be excluded from the category of goods under the UCC and § 503(b)(9).

But this Court discerns a marked difference between electricity and television, radio, telephone, and internet signals ("telecommunication signals"). Although their manifestations may appear similar, they are differentiated by both their physical attributes and the purposes for which they are purchased. Telecommunication signals are properly considered services because they are mechanisms by which other non-goods – intellectual property, ideas, sounds, music, images, and words – are sent from one location to another. Electricity, in contrast, is not merely a medium of delivery, but is *the thing* the customer seeks to purchase. Customers paying for telecommunication signals may, on the whole, be fairly unconcerned with the physical properties or mechanics of the telecommunications signals,

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providing any explanation for that characterization, and ultimately concluded nonetheless that electricity is a "product" for purposes of strict products liability. 410 N.E.2d 620, 623 (Ill. App. Ct. 1980). The second case is Pierce v. Pacific Gas & Electric Co., where the court cited the passage from Elgin in a footnote, see 166 Cal.App. 3d at 81 n.6, but also determined that electricity should be considered a "product" for purposes of applying strict products liability laws.

[33] For a thoughtful article discussing the approach to these issues urged by the Debtor and taken, in part, by the court in Pilgrim's Pride, see Philip J. Hendel, Does electricity qualify for an administrative expense claim? Query: Can you buy a can of it at Costco?, 51 Bankr. Ct. Decisions 21, at 4-5 (July 28, 2009).

except to the extent that those physical properties enhance the delivery of information. On the other hand, electricity customers are undoubtedly concerned with the intimate physical properties of electricity. That is, customers rely on the specific physical properties of electricity to fulfill their needs – anything deviating from those properties simply will not do. And it is those physical properties, the very nature of electricity, that customers contract to purchase.[34]

The Court agrees with NewEnergy that, although its ultimate nature may be mystifying to most, electricity *is* tangible and *does* possess physical properties. It is not

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[34] Electricity has been widely held to be both "property" and a "product" (for purposes of applying strict products liability principles). Although not dispositive of the question whether electricity is also a good under the UCC, the Court's review of relevant cases and the discussions of electricity contained therein reaffirm the Court's conclusion that electricity is tangible property. See, e.g., Commonweath v. Catalano, 908 N.E.2d 842, 845-46 (Mass. App. Ct. 2009) (Relying on Supreme Court case declaring that electricity is property, and other state courts holding similarly, the court concluded that electricity is a "personal chattel" which may the subject of larceny, because it "may be stored and conveyed . . . and may be transmitted through wires. Quantity of consumption is measurable, and the value of the electricity allegedly stolen may be the subject of testimony and exhibits."); Exxon Mobile Corp. v. Ala. Dept. of Conservation & Nat. Res., 986 So.2d 1093, 1110-11(Ala. 2007) (noting that, under Alabama law, electricity is considered a "manufactured product"); Monroe v. Savannah Electric & Power Co., 471 S.E.2d 854, 856 (Ga. 1996) (electricity is a product within strict liability statute); Bryant v. Tri-County Elec. Membership Corp., 844 F.Supp. 347, 349 (W.D. Ky. 1994) (electricity is a product under strict liability law); Houston Lighting & Power Co. v. Reynolds, 765 S.W.2d 784, (Tex. 1989) (holding that electricity is a "product" for purposes of strict liability and stating that "[e]lectricity is a commodity, which, like other goods, can be manufactured, transported and sold"); Schriner v. Pa. Power & Light Co., 501 A.2d 1128, 1133 (Pa. Super. Ct. 1985) (electricity is a product for strict liability purposes); Mancuso v. S. Cal. Edison Co., 232 Cal. App. 3d 88, 100 (Cal. App. Ct. 1991) (electricity is a product under strict liability law) (citing Pierce v. Pacific Gas & Elec. Co., 166 Cal.App.3d 68 (1985)); Smith v. Home Light & Power Co., 734 P.2d 1051, 1054, 1055 (Colo. 1987) (agreeing with other courts that electricity can be a product for strict liability purposes, but only after it passes through a customer's meter); Aversa v. Pub. Serv. Elec. & Gas Co., 451 A.2d 976, 980 (N.J. Super. Ct. 1982) (electricity is product under strict liability law); Elgin, 410 N.E.2d at 623-24 (electricity is a product under strict liability law); Ransome v. Wisc. Elec. Power Co., 275 N.W.2d 641, 643, 648 (Wisc. 1979) ("electricity itself, in the contemplation of the ordinary user, is a consumable product"); Hedges v. Pub. Serv. Co. Of Ind., Inc., 396 N.E.2d 933 (Ind. Ct. App. 1979) (electricity is a "product" for purposes of strict liability) (citing Petroski v. N. Ind. Pub. Serv. Co., 354 N.E.2d 736 (Ind. Ct. App. 1976)); but see, Bowen, 183 A.D.2d at 297(electricity is not a "product" for purposes of imposing strict liability); Otte, 523 N.E.2d at 839 (same).

simply an "idea" akin to intellectual property. Although perhaps lacking in corporeal shape and not easily observed, electricity really is some *thing*, something that can be felt (although we are loathe to) and something that can be created, measured and stored.

3. Is Electricity a *Good* under § 2-105(1) of the UCC?

Section 2-105(1) of the UCC defines *goods* as:

> all things . . . which are movable at the time of identification to the contract for sale . . .

U.C.C. § 2-105(1).

a. *Movability and Identifiability*

Electricity easily meets the movability requirement.[35] Neither the Debtor nor, insofar as the Court has determined, any court, has quarreled with the conclusion that electricity is literally movable.[36] After it is generated, the electric current *moves* through a huge network of transmission and distribution systems before ultimately reaching the customer's location.

Like movability, the identifiability of electricity is subject to little debate. "Identification of goods occurs when existing goods are designated, or agreed upon, as the goods to which the contract refers." 2 Anderson U.C.C. § 2-501:4, at 734 (3d ed. 2004). Courts have generally held that electricity is identifiable because it can be measured at the point it passes through the meter, see, e.g., Pacific Gas, 271 B.R. at 640 ("the amounts [of electricity] are metered and therefore identifiable"), and this Court agrees.

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[35] The movability requirement results in the exclusion of real estate from the definition of goods under the UCC. See, e.g., 2 Anderson U.C.C. § 2-105:36, at 140 (3d ed. 2004) (movability requirement "confirms the conclusion that goods involve personal property to the exclusion of real estate"); see also U.C.C. § 2-105 cmt. 1 ("The definition of goods . . . is not intended to deal with things that are not fairly identifiable as movables before the contract is performed.").

[36] See, e.g., Puget Sound Energy, Inc. v. Pacific Gas & Elec. Co. (In re Pacific Gas & Elec. Co.) 271 B.R. 626, 640 (N.D. Ca. 2002); Helvey, 278 N.E.2d at 610.

b. *Movability at the Time of Identification to the Contract*

While there is much agreement that electricity is both movable and identifiable, courts have reached different conclusions regarding whether electricity is movable *at the time it is identified to the contract* for sale.[37] The Debtor argues that electricity is no longer movable at the time it is identified to the contract (i.e., measured by the meter) because identification and consumption occur simultaneously.

But the conclusion urged by the Debtor rests upon an assumption with which the Court disagrees. The notion that electricity is consumed at the time it is identified by the meter (and is therefore no longer movable) is inconsistent with the fact that electricity does not simply reach a customer's meter and simultaneously cease to exist. Instead, it *passes through* the meter. At the time the electricity is identified to the contract, it is literally moving, *and* it remains movable for some period of time thereafter. The electricity continues to move through the customer's electrical wiring until it is ultimately put to use. This process may occur at speeds so imperceptible that consumption appears to occur simultaneous with identification, but logic compels the conclusion that the electricity is moving (and remains in motion) until it reaches the product sought to be electrified. Because the Court concludes that electricity is movable at the time it is identified to the contract, electricity constitutes a good within the meaning of the UCC and § 503(b)(9).[38]

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[37] Compare, e.g., Pacific Gas, 271 B.R. at 640 ("Simply put, electricity in this instance is a thing movable at the time of identification to the contract for sale."); with Pilgrim's Pride, 421 B.R. at 239 & n.8 ("Once electricity has been 'identified' by measurement at the meter, it has already been consumed by the end user." "It is difficult to imagine how electricity to be delivered could be identified at all before transmission to the customer").

[38] See also, Enron Power Mktg., Inc. v. Nev. Power Co. (In re Enron Corp.), 2004 WL 2290486, *2 (S.D.N.Y. 2004) (holding that Utah courts would consider electricity to be a good under Article 2 of the UCC); Pacific Gas, 271 B.R. at 640; Grant v. Southwestern Elec. Power Co., 20

4. Applicability of the "Predominant Factor Test"

Faced with the possibility that the Court might view electricity as part-good, part-service, the Debtor argues that the Court should then also adopt the "predominant factor test" to determine whether the transaction was primarily for the sale of goods or provision of services. According to the Debtor, claims arising from transactions primarily relating to the provision of services would, under this test, be excluded from the priority status granted by § 503(b)(9). The Court disagrees, for the same reasons other courts have employed to reject the application of that test to § 503(b)(9).

S.W.3d 764, 771 (Tex. App. 2000), rev'd on other grounds, 73 S.W.3d 211 (Tex. 2002) (citing, quoting Houston Lighting & Power Co. v. Reynolds, 712 S.W.2d 761, 766 (Tex. App. 1986), rev'd on other grounds, 765 S.W.2d 784 (Tex. 1988)); Cincinnati Gas & Elec. Co. v. Goebel, 502 N.E.2d 713, 715 (Hamilton Co. Mun. Ct. Ohio 1986) (electricity passing through meter and into consumer home is a good under UCC); Helvey, 278 N.E.2d at 610.

To the extent the Debtor relies on cases holding that electricity is not a good under the UCC, the Court finds those cases unpersuasive or distinguishable in that (1) the court's holding rests on public policy reasons not applicable here, see, e.g., Southwestern Elec. Power Co. v. Grant, 73 S.W.3d 211, 218-19 (Texas 2002) (holding that UCC Article 2 does not apply to the sale of electricity because doing so "would impair the comprehensive statutory scheme regulating the sale of electricity to Texas consumers"); New Balance Athletic Shoe, Inc. v. Boston Edison Co., 1996 WL 406673 (Mass. Super. Ct. 1996) (holding that electricity is not a good under UCC primarily because the court was "troubled by the sweeping implications that this analysis may have on public utilities" and leaving to the legislature the "decision to expose public utilities to liability for their 'products'"); (2) the written opinion does not detail the reasons behind the court's conclusion, see, e.g.,Norcon Power Partners, L.P. v. Niagara Mohawk Power Corp., 163 F.3d 153, 155 (2d Cir. 1998) (noting that "the UCC does not apply to the sale of electricity which is a service under New York law") (citing Bowen, 183 A.D.2d at 631-32); In re Samaritan Alliance, LLC, 2008 WL 2520107, at *4 (stating simply: "Having considered the arguments of the parties, the court concludes that while courts are divided on the general question of whether or not electricity is 'goods,' the court agrees with the Debtor that section 503(b)(9) is not applicable here and that the electricity provided is more properly characterized as a 'service.'"); or (3) the court was not deciding the issue presented in this case, see, e.g., Plastech, 397 B.R. at 839 (stating, in *dicta*, that " if the utility in question does not sell goods [ ], but instead is found to have sold services (e.g., electricity as in Samaritan Alliance, 2008 WL 2520107), then the seller of the services is not entitled to a § 503(b)(9) administrative expense priority . . . ."); The Singer Co. v. Baltimore Gas & Elec. Co., 558 A.2d 419, 424 (Md. Ct. Spec. App. 1989) (holding that electricity is not a good under the UCC when it remains int the utility company's distribution system, because in its "raw state" it is not the "refined product that the customer intends to buy").

The predominant factor test[39] is used by courts to determine whether the UCC Article 2 applies to a particular transaction. For transactions involving both the provision of services and the sale of goods, predominantly service-related transactions are not covered by the provisions of Article 2. See, e.g., White v. Peabody Constr. Co., 434 N.E.2d 1015, 1021 (Mass. 1982) ("Contracts whose predominant factor, thrust, or purpose is the rendition of services are not within the scope of art. 2."); Mattoon v. City of Pittsfield, 775 N.E.2d 770, 784 (Mass. App. Ct. 2002) ("Where a contract is for both sales and services . . . in order to determine whether art. 2 is applicable, the test is whether 'the predominant factor, thrust, or purpose of the contract is . . . "the rendition of service, with goods incidentally involved."'") (quoting White, 434 N.E.2d at 1021).[40]

At least one court has applied the predominant factor test under § 503(b)(9), limiting priority status to goods sold incident to transactions that were *primarily* for the sale of goods. See, Circuit City, 416 B.R. at 538. This Court, however, agrees with those courts which have concluded that the predominant factor test has no application to § 503(b)(9), because

[39] The predominant factor test is sometimes referred to as the "predominant purpose" or "predominant aspect" test, "but regardless of its caption, the test is essentially the same." Circuit City, 416 B.R. at 537 n.9.

[40] The Debtor relies on Mattoon in urging the Court conclude that electricity cannot be a good, because the Mattoon court held that water, which is even easier to grasp as a physical, tangible object, is not a good. But this is not what the Mattoon court stated. Because it was being asked to apply Article 2 of the UCC to the sale of water by the local water utility, the court first had to determine if the provision of water was primarily the sale of a good or provision of a service in deciding whether Article 2 applied. The court concluded that the amount the city charged to provide water included not only charges for the amount of water supplied, but also the additional costs of storing, treating and distributing the water. Ultimately, the court held that the predominant purpose of the transaction was the provision of services and not the sale of goods. 775 N.E.2d at 784. Thus, the court did not determine that water was not a good (in fact, the court implied that the transaction *did* involve the sale of goods), but only that the transaction as a whole should be deemed a service and was not governed by the provisions of Article 2. Id.

the language of that provision grants priority status for any claim arising from the "value of goods" sold to a debtor, regardless of whether the transaction as a whole could be characterized as primarily the provision of services. The Court adopts the explanation given by the court in In re Plastech:

> If a particular transaction provides for *both* a sale of goods and a sale of services, and the value of each of them can be ascertained, why shouldn't the value of the goods be entitled to the § 503(b)(9) administrative expense priority and the value of the services be relegated to an unsecured non-priority claim? . . . [T]his Court does not have to reach a determination as to whether the sales . . . would be considered sales of goods for purposes of the Uniform Commercial Code, products liability law, or tax law, under a predominant purpose test. Under § 503(b)(9), that determination is irrelevant. The only relevant determination under § 503(b)(9) is the value of the "goods" that were delivered, irrespective of whether the contract also called for the delivery and sale of services. The predominant purpose test does not inform the Court as to whether a particular thing that has been sold is or is not "goods." Therefore, the predominant purpose test is unnecessary.

397 B.R. at 837; see also Pilgrim's Pride, 421 B.R. at 237 & n.7.

Because, as noted earlier, the Court holds that the transactions between the Debtor and NewEnergy did not involve the rendering of services, it finds that the predominant factor test has no applicability here. But even were part of what was delivered to the customer a service, the predominant factor test would be irrelevant to the determination of the value of goods received by a debtor within the meaning of § 503(b)(9).

5. Relevance of Reclamation Provisions under § 546(c)

The Debtor posits an additional reason why electricity should not be considered a good under § 503(b)(9) – namely, that the meaning of *goods* under § 503(b)9) should be interpreted in relation to the reclamation provisions under § 546(c)[41] and properly includes

[41] Section 546(c) provides that a Trustee's power to, *inter alia*, avoid liens or transfers under § 544(a), 545, 547 and 549, are:

only goods that are capable of being "stockpiled" by debtors and reclaimed by creditors. But the Court finds that the Debtor's argument goes too far and disregards the plain language of § 503(b)(9). The reference in § 546(c)(2) to a reclaiming creditor's ability to assert a priority claim under § 503(b)(9) does not limit the right of other creditors – those who sell goods not easily susceptible to reclamation – to assert priority claims under § 503(b)(9). And the placement of both §§ 503(b)(9) and 546(c) in the "Reclamation" section of the enacting public law does not persuade the Court that Congress had the type of limiting intent the Debtor would ascribe; the sheer placement of sections of the public law cannot trump the plain language of the Bankruptcy Code. Therefore, the Court agrees with the court's analysis in In re Plastech, where the court explained that:

> "[T]here is no basis to import a requirement that the goods be reclaimable, as argued by the Debtor. Congress added § 503(b)(9) to the Bankruptcy Code as part of § 1227 of BAPCPA, entitled 'Reclamation.' Most of BAPCPA is devoted to amending § 546 of the Bankruptcy Code, which provides relief to sellers of goods who failed to give an effective notice for reclamation. The Debtor reads this scant legislative history as an indication that § 503(b)(9) is a reclamation concept, and suggests that goods must be reclaimable in order for a seller to have a § 503(b)(9) claim. However, there is nothing in §

> (1) . . . subject to the right of a seller of goods that has sold goods to the debtor, in the ordinary course of such seller's business, to reclaim the goods if the debtor has received such goods while insolvent, within 45 days before the date of the commencement of a case under this title, but such a seller may not reclaim such goods unless such seller demands in writing reclamation of such goods –
>
> > (A) not later than 45 days after the date of receipt of such goods by the debtor; or
> >
> > (B) not later than 20 days after the date of commencement of the case, if the 45-day period expires after the commencement of the case.
>
> (2) If a seller of goods fails to provide notice in the manner described in paragraph (1), the seller still may assert the rights contained in section 503(b)(9).

11 U.S.C. § 546(c).

> 503(b)(9) that requires a claimant to also be entitled to a reclamation right under § 546. Section 546 does not limit or control in any way the rights that claimant has under § 503(b)(9)."

Plastech, 397 B.R. at 838.[42]

6. Section 503(b)(9) and the "Narrow" Interpretation of Priority Statutes

Finally, the Debtor presents an "equitable" argument for the narrow construction of *goods* as used in § 503(b)(9). Because the Supreme Court has cautioned that priority statutes should be interpreted narrowly to advance the Bankruptcy Code's principle of equal distribution, the Debtor urges this Court to construe § 503(b)(9) as foreclosing priority status for claims arising from the sale of electricity. But this argument is premised on the Debtor's assumption that electricity does not easily fit within the meaning of *goods* under § 503(b)(9).

Recently, the Supreme Court rejected an "expanded interpretation" of § 507(a)(5), indicating that priority statutes under the Bankruptcy Code should be narrowly construed. Howard Delivery Serv., Inc.v. Zurich Am. Ins. Co., 547 U.S. 651, 667-68 (2006). In that case, however, the Court engaged in a lengthy discussion examining whether "an employer's liability to provide workers' compensation coverage fits the § 507(a)(5) category 'contributions to an employee benefit plan . . . arising from services rendered.'" Id. at 668.

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[42] But see, Circuit City, 416 B.R. at 536, 537 (stating that § 503(b)(9) "appears to have been adopted as an attempt by Congress to enhance certain types of reclamation claims raised by creditors in bankruptcy cases"); Southern Polymer, Inc. v. TI Acquisition, LLC (In re TI Acquisition, LLC), 410 B.R. 742, 745-46 (Bankr. N.D. Ga. 2009) (stating that "[w]hile no legislative history exists, one can only surmise that these amendments [adding § 503(b)(9) and revising § 546(c)] reflect Congress' intent to better insure that ordinary course of business sellers of goods received by the debtor in the twenty days before the petition date gain priority in payment over most other creditors"); Deer, 2007 WL 6887241, at *2 (stating that "§ 503(b)(9) was adopted to 'operate [ ] in conjunction with 11 U.S.C.A. § 546(c)(2) to provide administrative expense treatment to a creditor with reclamation rights even if the seller fails to make a demand'") (quoting, citing 3 Bankruptcy Desk Guide § 24:78.10 (Thompson/West 2007); William Houston Brown & Lawrence R. Ahern, III, 2005 Bankr. Reform Legis. with Analysis 2d § 7:1 (Thompson/West 2006)).

Explicating the typical characteristics of employee benefit plans, the Court found that worker's compensation coverage was not easily fitted into the common understanding of an "employee benefit plan . . . arising from services rendered." Id. Because the Court found it "far from clear" that the claims arising from worker's compensation payments fell within the terms of the priority statute, it resolved the "doubt concerning the appropriate characterization . . . in accord with the Bankruptcy Code's equal distribution aim." Id. at 668.

But that lack of clarity is not present here. Having determined that the only question is whether electricity, as supplied by NewEnergy, is a good under § 503(b)(9), this Court concludes that, using either the UCC definition or the definition urged by the Debtor, electricity easily falls within the definition. The Court should not find an ambiguity where there is none or make policy decisions to limit the application of Bankruptcy Code provisions when the language of the statute is otherwise clear.[43]

IV. CONCLUSION

For all the foregoing reasons, the Court concludes (1) that NewEnergy's Claim is based on the sale of electricity and not the provision of services and (2) that electricity constitutes a good under § 503(b)(9). Therefore, the Debtor's Objection will be overruled. An order in conformity with this Memorandum of Decision will issue forthwith.

DATED: April 7, 2010

By the Court,

Henry J. Boroff
United States Bankruptcy Judge

[43] See Lamie v. U.S. Trustee, 540 U.S. 526, 533 (2004); Conn. Nat'l Bank v. Germain, 503 U.S. 249, 253-54 (1992); United States v. Lewis, 554 F.3d 208, 214 (1st Cir. 2009).

Appendix 1

SEARCH

Energy & Environment

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Description of the Restructured Electric Industry

BACKGROUND

Summary of the Department's Electric Industry Restructuring Rulemaking Proceedings

It is useful to think of the electric industry as being comprised of four components: (1) generation, the power plants that create the electricity that is transported to homes and facilities in Massachusetts; (2) transmission, the wires and associated facilities that transport the electricity (at high voltage levels) from power plants to distribution substations; (3) distribution, the wires and associated facilities that transport the electricity (at lower voltage levels) from distribution substations to customers' facilities and homes; and (4) customer services, which covers, among other things, metering, billing, and information services. In the electric industry as it existed before restructuring, these components were bundled and provided as monopoly services by electric companies, at prices fully regulated by the Department.

As of March 1, 1998, the generation component has been unbundled from the other components of electric service. Customers are now able to purchase generation services from entities other than their traditional electric companies. The prices that these "competitive suppliers" of generation service may charge customers will be determined by the competitive market; these prices will not be regulated by the Department, although the suppliers will be licensed by the Department.

The other components of electric service (transmission, distribution and customer services) have not been opened to competition; instead, these components will continue to be provided as monopoly services by the electric companies. With regard to metering, billing, and information services, the Legislature directed the Department to investigate whether these services should be unbundled and provided through a competitive market. In a December 29, 2000 report to the Legislature, the Department concluded that these services should not be provided competitively.

Customers' bills currently are presented in an unbundled format that shows the various components of electric service, as shown below. The rates and the format of the sample bill shown below are intended for illustrative purposes only; they do not represent the format or charges for any particular Distribution Company's bill. Below the sample bill is a brief description of each line item shown on the bill.

Delivery Services		
Distribution Service	Customer charge	$7.00/month
	Energy charge	$0.035/kwh
Transmission Service		$0.007/kwh
Transition Costs		$0.015/kwh
DSM charge		$0.0025/kwh
Renewables charge		$0.00075/kwh
Supplier Services		
Generation Service		$0.06/kwh

Distribution Service - Very little has changed in the way that distribution service is provided to customers. Distribution service remains a monopoly service provided exclusively to customers in a particular service territory by the local electric company (now referred to as a Distribution Company). Rates for distribution service continue to be fully regulated by the Department at levels that allow each Distribution Company a reasonable opportunity to recover the costs it incurs in providing this service to its customers.

Transmission Service - Similar to distribution service, there is little change in the manner in which transmission service is provided to customers at the retail level. Retail transmission rates continue to be fully regulated by the Department at levels that allow each Distribution Company a reasonable opportunity to recover the costs it incurs in providing this service to its customers. However, there have been significant changes in the manner in which transmission service is provided at the wholesale level. In its Order 888, issued April 24, 1996, the Federal Energy Regulatory Commission ("FERC") established the principle that owners of transmission facilities must provide transmission services to third parties on the same (or comparable) basis, and under the same (or comparable) terms and conditions, as applies to the owners' uses of their systems.

Transition Costs - Transition charges are set at levels that allow each Distribution Company a reasonable opportunity to recover its fully-mitigated stranded costs. The Restructuring Act established certain categories of costs that qualify as stranded costs. For costs incurred prior to January 1, 1996, these categories are (1) fixed generation-related costs, (2) above-market purchased power contracts, (3) generation-related regulatory assets, and (4) nuclear decommissioning costs . For costs incurred after January 1, 1996, transition cost categories are (1) employee-related costs related to restructuring, (2) payments in lieu of taxes, and (3) removal and decommissioning costs for fossil-fuel generators.

Demand Side Management ("DSM") and Renewable Charges - The Restructuring Act established the following rate schedules for DSM and renewable energy activities.

Year	DSM	Renewables
1998	0.33 cents/kWh	0.075 cents/kWh
1999	0.31	0.1
2000	0.285	0.125
2001	0.27	0.1
2002	0.25	0.075
2003		0.05

Revenue from the DSM charges will be collected by each Distribution Company and will be used to fund DSM programs and activities that will administered individually by each Distribution Company, consistent with the manner in which DSM programs have previously been administered in Massachusetts.

Revenue from the renewable charges is presently collected by each Distribution Company, which transfers the revenue to the Renewable Energy Trust Fund. This fund is being administered by the Massachusetts Technology Collaborative, through its newly created Renewable Energy Trust.

Generation Service - There are three generation service options available to consumers: (1) Standard Offer Service, provided by Distribution Companies; (2) Default Service, provided by Distribution Companies; and (3) competitive generation service, provided by competitive suppliers. It is important to remember that a customer that is connected to a Distribution Company's system will receive electric service, regardless of the option under which the customer is receiving generation service. However, the price that the customer pays for generation service is dependent on the type of service the customer is receiving.

Standard Offer Service is a transition generation service that will be available to customers of record of each Distribution Company through 2004. A customer that did not select a competitive supplier as of March 1, 1998 automatically was placed on Standard Offer Service (customers who move into a Distribution Company's service territory after March 1, 1998 are not eligible to receive Standard Offer - these customers are placed on Default Service until they select a competitive supplier). In general, once customers select a competitive supplier, they are no longer eligible to return to Standard Offer

Service, except that (1) low-income customers can return at any time; (2) residential and small commercial and industrial customers can return within 120 days of selecting a supplier (this option is available only until March 1, 1999); and (3) customers participating in a municipal aggregation program can return within 180 days of joining the program. The rates for Standard Offer Service are regulated by the Department and are set at levels that provide a 10 percent overall bill reduction to customers receiving Standard Offer Service; the level of the overall bill reduction for Standard Offer customers will increase to 15 percent on September 1, 1999.

Default Service is the generation service that is provided by Distribution Companies to those customers who are not receiving either competitive generation or Standard Offer Service. Customers who move into a Distribution Company's service territory after March 1, 1998 will receive Default Service until they select a competitive supplier. Prices for Default Service are regulated by the Department and may not exceed the average market price for electricity in New England.

Competitive Generation Service will be provided by competitive suppliers and electricity brokers that have been licensed by the Department. A Competitive Supplier is an entity that is licensed by the Department to sell electricity and related services to customers (DTE Supplier/Broker License Application PDF). An Electricity Broker is an entity that is licensed to facilitate or otherwise arrange for the purchase and sale of electricity and related services to customers, but is not licensed to sell electricity to customers. An applicant for a competitive supplier or electricity broker license must demonstrate, among other things, the financial and technical capability to provide the applicable services. Prices for Competitive Generation Service will be set by the competitive electricity marketplace; these prices will not be regulated by the Department.

Before initiating generation service to a customer, a competitive supplier must complete a three-step process. First, the supplier must obtain authorization from the customer either through (1) a letter of authorization, (2) third-party telephone verification, or (3) the completion of a toll-free telephone call initiated by the customer. Second, once customer authorization is obtained, the competitive supplier must send an information disclosure packet to the customer, describing, among other things, the contractual terms the customer has agreed to, and the fuel mix and environmental characteristics associated with the supplier's generating resource portfolio. Third, the competitive supplier must allow for a three-day recission period to elapse before initiating generation service to a customer (the recission period beings upon the customer's receipt of the information packet). Once these steps are completed, the competitive supplier may initiate generation service to the customer by informing the customer's Distribution Company that, upon the customer's next meter read date, the supplier will be providing generation service to the customer.

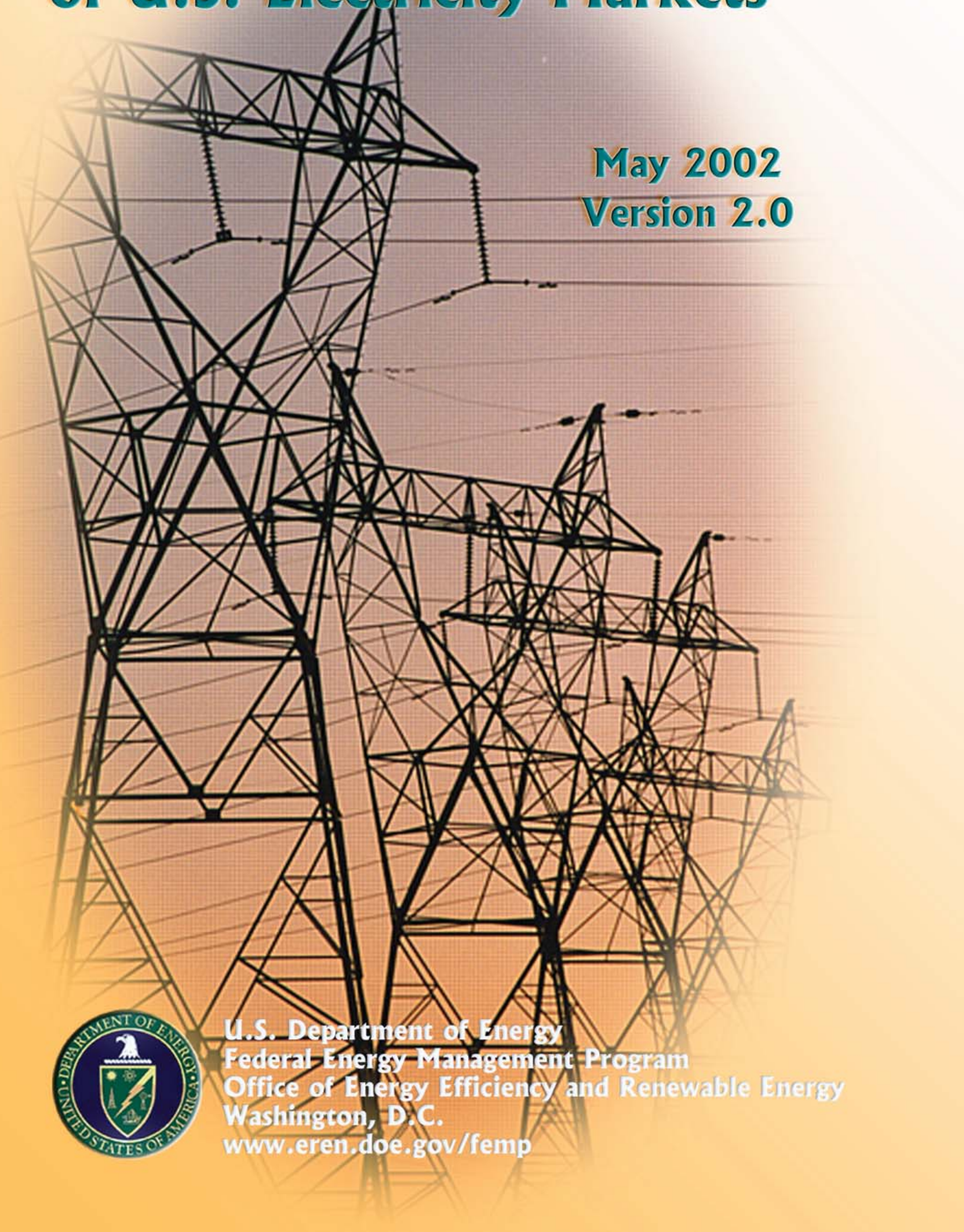
Customers receiving generation service from a competitive supplier have two billing options: (1) complete billing, under which a customer would receive a single bill from the Distribution Company, including charges for generation service; and (2) pass-through billing, under which a customer would receive two bills, one from the Distribution Company for non-generation charges and a second bill from the competitive supplier for generation service charges.

For more consumer information regarding Electric Industry Restructuring, visit the Commonwealth's Consumer Education Site.

This information is provided by the Department of Public Utilities

Appendix 2

A Primer on Electric Utilities, Deregulation, and Restructuring of U.S. Electricity Markets



May 2002
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Federal Energy Management Program
Office of Energy Efficiency and Renewable Energy
Washington, D.C.
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A Primer on Electric Utilities, Deregulation, and Restructuring of U.S. Electricity Markets

W.M. Warwick

July 2000
Revised May 2002

Prepared for
the U.S. Department of Energy
Federal Energy Management Program
under Contract DE-AC06-76RLO 1830

Pacific Northwest National Laboratory
Richland, Washington 99352

Contents

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Foreword

A primer, by design, simplifies complex subjects. This primer is no exception. As a result, discussions of many topics may be more black and white than is the case in reality. Further, the process of selecting topics, and summarizing and editing text all introduce a point of view. Although every effort was made to present a balanced discussion, some readers may detect an occasional bias. This is unfortunate, but unavoidable. Although this document was thoroughly researched, errors in source material, interpretation, and editing are inevitable. That said, this is a dynamic document and comments and corrections are welcome. http://pnnl-utilityrestructuring.pnl.gov/electric/Primer/index.htm

Comments and suggestions can be posted via the Restructuring web site or can be sent to the author directly (Mike.Warwick@pnl.gov).

Summary

The objective of the Federal Energy Management Program is to provide Federal agencies and facility managers with timely and accurate information about electric industry restructuring to facilitate wise procurement of power and appropriate decisions about energy efficiency and other energy management investments in the face of industry change. This primer is offered as an introduction to utility restructuring to better prepare readers for ongoing changes in public utilities and associated energy markets. It is written for use by individuals with responsibility for the management of facilities that use energy, including energy managers, procurement staff, and managers with responsibility for facility operations and budgets. The primer was prepared by the Pacific Northwest National Laboratory (PNNL) under sponsorship from the U.S. Department of Energy (DOE) Federal Energy Management Program (FEMP). The impetus for this primer came from the Government Services Administration who supported its initial development.

Summarizing a subject this complex, even in the context of this simplified Primer, is challenging. Following is a list of highlights; these concepts are more thoroughly described in the following chapters. Terms are defined in an extensive glossary provided at the end of the report.

- The historic practice of providing consumers with electricity from a monopoly provider is not as efficient economically as it used to be due to the growth in independent power plant developers and competitive wholesale electricity markets. Giving retail customers the opportunity to choose their power supplier is expected to stimulate markets to reduce power costs and increase power products and services.

- There is a legacy associated with traditional utility practices that requires a transition period before power markets are truly open and competitive. The procedure and schedule for transitioning to competitive retail electricity markets is up to each state. Roughly half of the states have adopted a schedule for deregulation to date.

- Changing how retail consumers purchase power requires changes throughout the industry. Now that this process has been launched, the industry is restructuring itself to adapt to competition. The path forward is not fully known, but will involve existing utilities selling off their power generators as well, perhaps, as transmission lines. At a minimum, the operation of individual utility transmission lines will be taken over by third-party operators who will run them as a single, integrated system to serve competitive regional wholesale power markets.

- Retail power sales to consumers are being taken over by a variety of new power suppliers, many of which are subsidiaries of utilities based in other states. These new suppliers are not able to offer significant bill savings under most state transition rules (although they are offering new services including power from renewable resources). Most customers continue to receive power from the local utility on so-called default service rates that continue to be regulated.

- Competitive power markets are based on bids by generators into a single market, generally on an hourly basis. Market prices have been volatile. Prices are expected to continue to be volatile and

may become more so, unless new generation and transmission can be constructed to meet rising power demand. Fortunately, planned generation additions appear to be adequate to meet expected demand for the rest of the decade. Unfortunately, these new plants may not prevent spot shortages in certain areas or during high-use periods. Also, transmission construction is not keeping pace with either new plant additions or demand growth. This may result in increased transmission costs, outages, or both. This situation may continue for several years, as it takes roughly seven years to site and build new transmission lines.

- Utility-sponsored energy management programs are being phased out in the face of deregulation. Customer-funded programs operated by third parties are replacing many of these programs and new power suppliers are offering their customers' free energy audits and other energy management services, often for a fee. Some states have adopted utility fees that are used to fund energy-efficiency programs. An independent body, not the utility, often manages these funds.

- In the face of competition for electricity supplies, Federal agencies are required to solicit competitive proposals from alternative suppliers. The GSA and DESC aggregate the energy needs of Federal agencies in every state that deregulates. These GSA and DESC aggregation pools provide an easy energy purchasing option for individual Federal agencies and facilities.

- As deregulation and industry restructuring evolves, new issues will emerge. One of these is reliability. Another is the role customer-owned generators can play in managing volatile power prices.

- The best way to navigate the changing currents of utility deregulation and restructuring is to have a plan and an energy management team. It will take some work to pull together an Energy Management Team and develop an Energy Plan or Strategy, but this will pay off in the long run.

Up-to-date information on the status of deregulation in each state and updated versions of this primer are available on the FEMP restructuring web site:
http://pnnl-utilityrestructuring.pnl.gov/electric/Primer/index.htm

If you find this primer to be of value or if you have corrections, comments, or criticisms concerning this primer, restructuring, or FEMP, please send them to us via the web site, or to the author directly (Mike.Warwick@pnl.gov).

Acronyms

BTU	British thermal unit
COB	California-Oregon border
CCCT	combined-cycle combustion turbine
CT	combustion turbine
DESC	U.S. Department of Defense's Defense Energy Service Center
DOE	U.S. Department of Energy
E&P	exploration and production
ERCOT	Electric Reliability Council of Texas
EWAG	exempt wholesale generators
FERC	Federal Energy Regulatory Commission
FOB	freight on board
FPC	Federal Power Commission
G&T	generation and transmission
GSA	General Services Agency
GW	gigawatt
IGCC	integrated gasified combined cycle plants
IOU	investor-owned utilities
IPP	independent power producers
ISO	Independent System Operator
ITC	independent transmission companies
KWh	kilowatt hour
MAAC	Mid-Atlantic Coordinating Council
MCP	market clearing price
MMP	market marginal price
MW	megawatt
NE Pool	New England Power Pool
NERC	North American Electric Reliability Council
NY Pool	New York Power Pool
OH	operating hour
PBR	performance-based regulation
PJM	Pennsylvania, [New] Jersey, and Maryland Pool

PMA	DOE's power marketing administrations
PNNL	Pacific Northwest National Laboratory
POU	publicly owned utility
PSC	Public Service Commission
PUC	Public Utilities Commission
PUHCA	Public Utility Holding Company Act
PURPA	Public Utility Regulatory Policies Act
QF	qualifying facilities
RPS	renewable portfolio standard
RTG	Regional Transmission Group
RTO	regional transmission organization
TOU	Time-of-use
TVA	Tennessee Valley Authority
USPS	U.S. Postal Service
VA	Veterans Administration
WSCC	Western Systems Coordinating Council

4.0 Transmission and Distribution

People tend to be more familiar with the distribution lines in their neighborhoods than with high-voltage transmission lines. Typically, transmission lines are located in remote areas so they can run for long distances in a straight line, as it is much cheaper to build that way. In contrast, distribution lines have to be close to the customer (Figure 4.1). Consequently, they are more numerous. In general, distribution lines are *radial*, or run away from the transmission lines to a dead end.

Power typically flows from a generator, along the transmission grid to a substation where it is transformed, or *stepped down*, to a lower voltage for distribution. The voltage reduction allows the utility to use smaller wires and shorter poles for distributing power to consumers. Power on the distribution line flows to customer homes and businesses, but it gets stepped down again as it comes off the distribution lines. Those large, round, black transformers that are mounted on the top of power poles outside homes do this transformation. If the home or business is served with underground wires, the transformer is mounted on the ground in a housing of some sort.

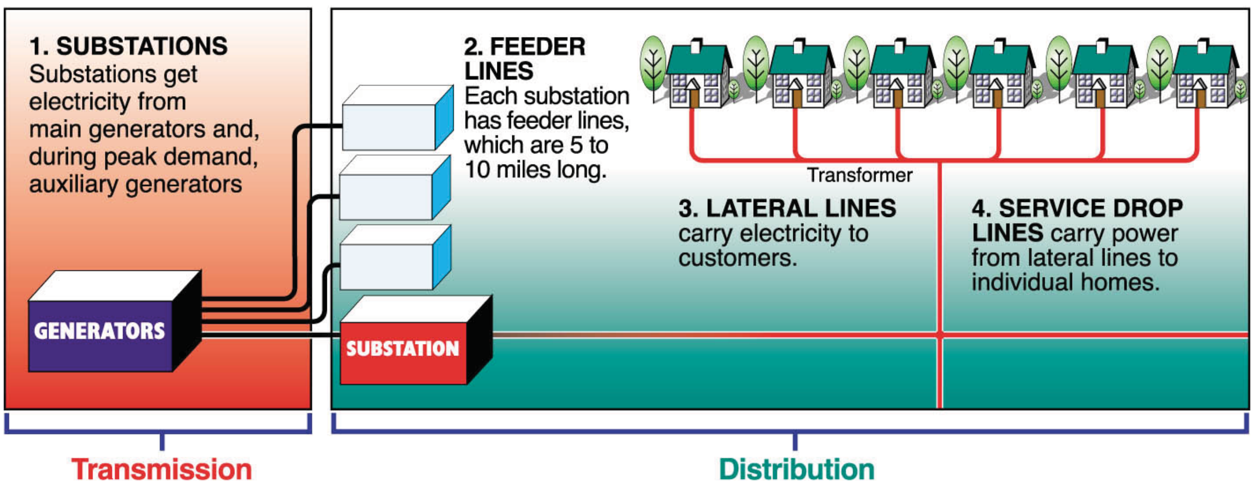


Figure 4.1. The transmission grid moves wholesale power from generators to distributors. The distribution system moves retail power from distributors to customers. Transmission will continue to be regulated at the federal level by FERC. Distribution will continue to be regulated at the state level by state commissions.

4.1 Transmission

When most people think of an electric utility they envision a company, typically associated with a major metropolitan region, that owns generating plants located far away from most of its customers. A large concentration of customers, like a metropolitan area, is called a *load center*. Power from remotely located generators travels to load centers along high-voltage transmission lines (Figure 4.2). The linkage between power plants and load centers via transmission lines is familiar to most people due to the wide swath of land associated with transmission corridors. Less obvious is that transmission lines also connect to each other forming a network, called the *transmission grid*. The combination of generation and the transmission network is referred to as a *power grid* or power system.

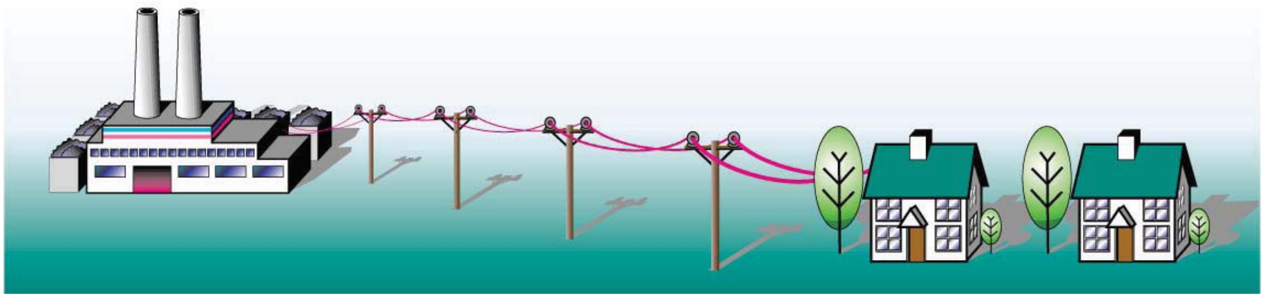
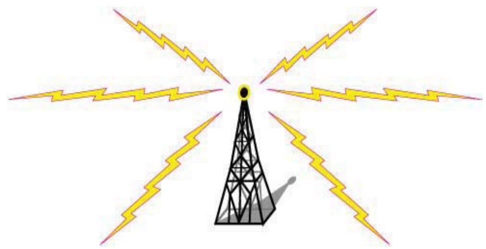


Figure 4.2. Power plants have almost always been located away from the loads they serve. The first plants were in industrial areas close to industrial coal supplies or, in the case of hydropower, along distant rivers. The first electric loads were lights in wealthy neighborhoods far removed from the industrial and shipping areas. Transmission lines tied the generation and the loads together.

Areas that are not well integrated into the power grid are called *load islands*. Load islands are usually literal islands, like Manhattan and Long Island in New York or peninsulas, such as the DelMarVa and Monterey peninsulas. These areas tend to have fewer transmission lines into them than they would if they were more centrally located on the power grid. Rapid urban growth or lagging construction of transmission can also create *load pockets* within the power grid.

4.1.1 Control Centers



Because so few retail utilities actually own and operate their own generation, they rely on other utilities, usually the largest utilities in the region, to provide for the transmission of power to them in a process called *wheeling*. Wheeling power requires the use of transmission lines that are owned by multiple utilities. This use needs to be managed so that power can be tracked as it flows from utility to utility across the grid. Utilities manage the operation of generation, transmission, and transmission maintenance from facilities called *control centers.* Power that is wheeled through a system is coordinated between adjacent control centers. Although there are over 3,000 retail utilities, there are only 140 control centers in North America.

Figure 4.3 shows a typical control center, this one located in Texas. At a control center, control is provided through the computer terminals on the operators' desks. These terminals provide schedules for the operation of generators and resulting transmission loadings. They also provide real-time information so operators can verify that schedules are being followed and take corrective action when there are deviations from the schedule or if customer demand or weather is different than expected. System controllers communicate with power plant operators and transmission crews through secure computer, telephone, or radio connections.

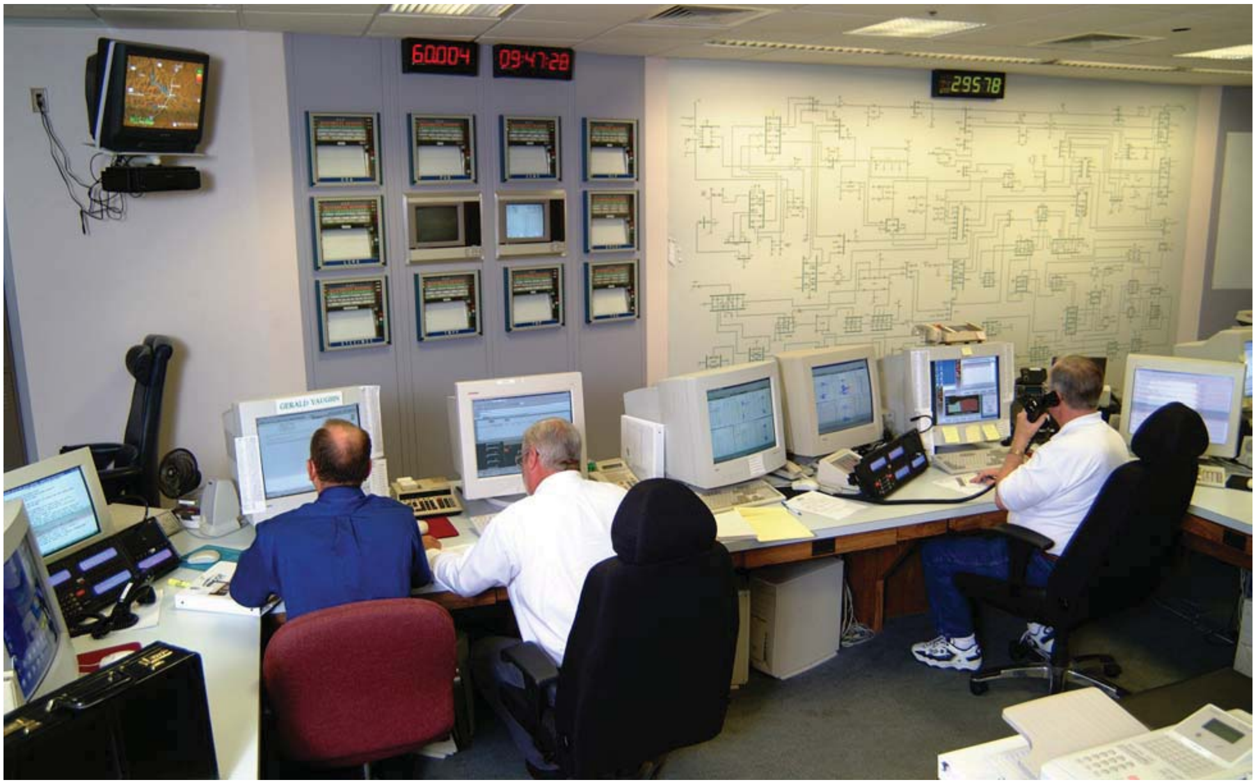


Figure 4.3. This photo highlights the key features of a control center. On the far right is a map. Although it is too small to show these details, the map indicates the location of power plants and transmission lines under the control of the center, usually with colored lights that indicate the status of the power plant or transmission line (e.g., red for out of service). Connections to adjacent control areas are also indicated. (Photo courtesy of Electric Reliability Council of Texas [ERCOT].)

4.1.2 Reliability and Outages

When consumers think about reliability, they generally think in terms of power outages, but reliability is much more complex than that. Transmission and generation work together. Given the roles each performs, they are effectively substitutes for one another. In other words, power can be transmitted from a remote power plant to a customer, or it can be generated locally, near the customer. In the first instance, transmission substitutes for near-by generation. In the second, generation substitutes for transmission capacity.

The benefit of an extensive transmission system is that it provides access to generation across a much broader area. This allows power purchasers to hunt for lower cost power than might be available locally and for distant generators to perhaps sell their low-cost power for a higher profit. It also allows utilities to diversify the source of their purchases. However, an extensive transmission system also has costs, in addition to the expense of construction and maintenance. Reliance on power from distant power plants delivered over long transmission lines leaves a utility vulnerable to disruptions on the power lines. This has to be taken into account when the utility plans its generating reserve margins, lest it find itself with power supply contracts in hand, and no power deliveries to back them up. These are the kinds of issues that utilities must include in their generation and transmission planning and operations.

Reliability is actually composed of two elements, *adequacy* of generation and transmission capacity and *reliability* of transmission and distribution system performance. In other words, is there enough power and transmission capacity and can it be used to get power to all customers when they need it?

When consumers have a power outage, they tend to blame "the power system" or "the utility." In fact, less than 10% of consumer outages are the result of failures of the main power grid (the generation and bulk power transmission system). About 10% are due to substation failures. The remaining 80% of outages occur in the local distribution system, caused by falling tree limbs or other vegetation, animals getting into the power lines, automobile accidents, and lightning strikes or other severe weather. Typically, distribution outages are localized. In other words, only a small area of the utility system is out of power. Major storms can knock out power to larger areas without actually bringing down the entire power grid. This is because transmission lines are built to be above or away from trees that can interfere with them, while distribution lines tend to follow along tree-lined streets in cities and towns.

Outages are measured in terms of duration and number of customers affected, or "customer-hours" of outage. Another measure, usually mislabeled as "reliability," is the percentage of time the power system "works." Typically, power systems work at least 99.9% of the time. This is called 3-nines power (because there are three nines in the percentage, see Table 4.1). Electronic equipment is highly sensitive to power outages and deviations in voltage and frequency (the 60 Hertz, or cycle, frequency that is characteristic of the North American electric grid). Users of sensitive electronic equipment, or even highly automated manufacturing operations, require power that is highly reliable and "clean," or with few voltage or frequency deviations. Companies that host Internet servers typically want both "quality" power and "high-9s" power.

All the talk about high-9s power quality and the lack of "reliability" of the power system has obscured the fact that the bulk power grid is highly reliable. If distribution outages are eliminated from outage statistics, reliability at the transmission level would be in the range of 99.999%. Unfortunately, regulators are primarily interested in customer service outages and utilities normally don't separately report outages on the transmission system versus the distribution system. Nevertheless, a system-wide (transmission level) outage usually warrants front-page coverage in the newspaper. How many of those have you seen lately? Recognizing this, some manufacturers in Silicon Valley had the local utility connect them directly to the high-voltage transmission grid.

Table 4.1. Reliability Yardstick - Typically power systems are reliable at least 99.9% of the time. Users of sensitive electronic equipment require power that is highly reliable, called "high-9s" power.

Duration of all outages/year	Reliability percentage	Number of 9s*
8.76 hours	99.9	3
0.876 hr. or 52 min.	99.99	4
0.087 hr. or 5.2 min.	99.999	5
0.0087 hr. or 31.2 sec.	99.9999	6
0.0008 hr or 3.12 sec.	99.99999	7
0.00008 hr. or .3 sec.	99.999999	8
0.000008 hr. or ~ 2 cycles	99.9999999	9
* For reference, control systems on the bulk power system typically operate no faster than 3 cycles (one twentieth of a second). Accordingly, 7-nines is about the limit for power system reliability.		

4.1.3 Adequacy, Reserve Margins, and System Reliability

Transmission systems are planned following assumptions that are similar to generation, namely, demand growth is uneven and unexpected things happen that need to be anticipated. Unlike generation, transmission is both static and fixed, as well as being long-lived. A transmission line delivers power from point a to point b. It can't direct the power itself (that is done through the operation of generation and transmission at the control center). Further, transmission lines are "lumpy." In other words, they come in only a handful of sizes. If one is too small for the job, the next size up represents a significant increase in cost and transmission capacity.

Transmission lines don't wear out, per se, so once they are built, they tend to last for decades. More significantly, obtaining rights-of-ways for transmission lines is difficult and time consuming. As a result, once a transmission corridor is established, transmission planners anticipate using it for decades to come and tend to size transmission lines to meet future growth for the foreseeable future. The extra capacity on the line provides a reserve for unanticipated events, as well as future growth; however, transmission planners have other guidelines they also follow to ensure adequacy.

When power is injected onto a transmission line, it flows through the entire network, not just from point a to point b. Using the old "electricity flows like water" analogy, it is similar to a network of irrigation canals, where the water seeks the same level no matter where it comes in or where you want it to go. A transmission line outage (for maintenance as well as unanticipated disruptions) acts like a dam on an irrigation canal, forcing the water around the blockage. If adjacent transmission lines cannot handle the power that is rerouted, safety devices will switch them off, further impeding power flows and potentially leading to cascading outages and system failure, i.e., a blackout. As a result, transmission planners and operators plan to have back-up transmission lines available just in case a line goes down. As long as there are plenty of lines, and "spares" in reserve, there will be *adequate* transmission.

Few consumers are aware of the role *generation* plays in ensuring *transmission* reliability. Electricity flows at the speed of light. As a result, electricity generation, transmission, and use are interdependent and have to be in balance from moment to moment. In other words, how electricity is generated and transmitted affects how it can be used and vice versa. Therefore it is important for all elements of the electric grid, including interactions between the grid and consumption, to be synchronized. The responsibility for this synchronization falls on generators and the transmission system operators that control them.

Generation is dynamic, whereas transmission and consumption are assumed to be essentially passive elements of the power grid. Therefore, generators are used to react to changes in electricity use and to changes in schedules for generation or transmission. For example, if a generator that was scheduled to operate doesn't, another generator somewhere else has to take up the slack. Similarly, if a transmission line is unavailable, the output of all generators will need to be changed to make sure power flows around the line that is out of service. The process involved in both cases is called *redispatch*.

Although the transmission system is designed for reliability, the location of generation on the transmission grid is part of that design. Instead of building a redundant line from remotely located power plants all the way to the urban load centers, a generator may be located at the midpoint of a transmission line. This effectively protects against transmission line failures upstream of its location. In other words,

if the transmission line upstream of the power plant fails, the power plant can increase its output to replace the power that the transmission line was carrying.

Because the transmission system's redundant transmission elements and generation location ensure its reliability, transmission planning and expansion typically accompany the addition of new power plants. This is a very important point. The last round of power plant additions was in the 1980s. These were plants constructed by utilities and paid for by rate payers under traditional regulatory schemes. These new plants were accompanied by an expansion of the transmission system within utility service areas. In retrospect, "too much" generation and transmission was built in the 1980s and that resulted in a lack of new power plants through the 1990s. We have pretty much used up the spare generating capacity from the 1980s along with the associated transmission. The consequences of this are now evident in recent power shortages and power price spikes and volatility. In the new deregulated era, construction of power plants falls largely to non-utilities. The issue of transmission planning and construction is, as yet, unresolved. This topic will be discussed further in the sections on deregulation, but it is important to note the underlying dynamics here.

4.1.4 Ancillary Services

Generators provide a variety of *ancillary services* to the transmission function, including

- regulation of voltage (i.e., the 120-, 240-, and 480-volt current at the power panel) and frequency (the 60-cycle signature for North American power systems)
- reserves (back-up energy supplies)
- reactive control (the basis for reactive charges)
- load following (exactly matching generation to consumption).

Without these services the power system would be unreliable even with adequate generating and transmssion supplies. Ancillary services require few generators relative to those needed for power supply (less than 10% actually operating); however, the services these generators provide are absolutely critical. The control center provides for these services in the way it schedules and dispatches power plants. Generating reserve margins were discussed previously as a regulatory requirement to meet emergencies during peak demand periods.

Two different types of reserves are required for system reliability. The first is called *non-spinning reserve*, or *installed capacity reserve (ICAP).* This is usually supplied by power plants that are available for operation, but sitting idle. Typically, these plants need to be capable of starting up to provide reserves within 10 minutes. Some system operators call this "10-minute reserves" as a consequence. The other type of reserve is called *spinning reserve* or *operating capacity reserve (OCAP).* Spinning reserves are provided by power plants that are actually operating, but at less than full capacity, hence the generators, or at least the prime movers that turn them, are "spinning." Spinning reserves need to be available within 10 minutes, to ensure that adequate voltage is maintained on the system until non-spinning back up generators come on line to provide system support.

Another ancillary service is *reactive control*. Reactive power, also called imaginary power, is a creature of alternating current power systems. It is somewhat difficult to explain, but it typically results from interactions between electric motors and generators. Electric motors rotate like generators but act as if

they were working **against** the power system. That requires the power generators to work harder and burn more fuel. Thus, there are **real** costs for supplying **imaginary** power. This is why utilities charge large customers a reactive power fee in their rates. Reactive control is provided at the system level through the operation of selected generators, dedicated to this function. Out on the transmission and distribution system, reactive control is usually provided by capacitor banks.

Generation needs to match electrical demand on a moment-by-moment basis or there is a risk that certain power quality standards won't be met, specifically voltage and frequency. Industry standards are set for voltage and frequency although these standards allow for limited deviations. For example, when a large load is turned on, generators are forced to work harder, which can cause a temporary drop in voltage until the generators catch up. There are generators dedicated to providing this kind of support to the system, and they constitutes a service called *automatic generator control,* or *AGC*. AGC keeps the power grid synchronized so all of the generators are working together.

A related ancillary service is one that provides the necessary energy to match generation to loads within an hour. For example, a power plant may schedule to provide 100 megawatts of energy to the system between noon and 1 PM but may actually provide 120 megawatts in the first 30 minutes and 80 the next. Because the system operator was expecting a uniform 100 megawatts of generation, he had to make up for the difference by changing how some generator operated. This could be done by controlling a specific generator or by redispatching several generators. In either case, there is a cost associated with these changes for *load following*, or *imbalance energy*. Conversely, a utility may have purchased 100 megawatts for use between noon and 1 PM and actually used 120 megawatts the first 30 minutes and 80 the rest. As a result, they may be subject to the imbalance energy charge.

Not all system operators levy imbalance energy charges. Some roll it into other charges or require power sellers to provide this service on their own. Imbalance energy charges can be a significant barrier to the construction and use of generation that is difficult to predict or schedule, such as that from wind or solar generation and distributed generators.

Failures of the bulk power system are rare. When they occur, outages are widespread and the subject of intense industry analysis. The electric industry deals with failures of the bulk power grid like the airline industry handles plane crashes. They thoroughly review what happened, and why, and change practices to prevent a future reoccurrence. These investigations are initiated by the regional industry reliability organization; these organizations form the *North American Electric Reliability Council* or NERC (see sidebar). The NERC has increased its focus on grid reliability by requiring each region to have a designated *security coordinator*.

4.2 Distribution and Customer Service

The distinction between transmission and distribution for a utility is not as obvious as the consumer might think. In fact, the industry has tried to draw a so-called bright line between the two with little success. Such a line is needed to clarify FERC and State jurisdiction over power line regulations and rates. In general, transmission lines are high-voltage lines, those with kilovolt-ampere (kva) ratings of 750, 500, 230, and 115. Distribution lines have lower voltage ratings, such as 69, 34, and 13 kva. For convenience, many in the industry refer to ratings of 115 kva and above as transmission. Things are not that simple, however, because lower voltages are often used for transmission in rural areas where power transfer

requirements are less. A functional definition is also used. Typically, transmission lines serve the bulk power system and distribution lines serve retail customers. This distinction is also compromised as large industrial customers often receive retail service over high-voltage lines.

It is not unusual in rural areas for both retail and wholesale transaction to use the same low-voltage wires. In those situations, both FERC and the state may have authority to set access terms and rates, often in conflict with each other. For example, FERC's access terms for transmission lines require open access, whereas state regulations prohibit retail access prior to deregulation. Similarly, FERC may assign different rates for transmission than states do for distribution, even when both transactions are using the same lines. Regardless, the transmission component of retail rates is generally small, typically less than 10% of the total cost of power.

The energy component of rates varies from approximately two-thirds of the bill for large customers to less than one-third for small customers. Conversely, charges associated with local utility operations compose one-half to two-thirds of most retail customers' bills. The balance of the rate pays for customer services, including maintenance and repair of the power lines, customer offices, and so on. Each of these has become an expected part of regulated utility service at the retail level. Deregulation may make some of these competitive and others non-economic. Therefore, a review of the primary distribution customer services available to retail customers is useful.

4.2.1 Service Offices

Customer service offices provide customers with a convenient way to pay bills, open and close accounts, and resolve complaints. Utilities use these offices as part of their marketing, public relations, and community involvement efforts, including meeting with customers to discuss new service requirements and promoting energy-efficiency services. Often, they are used as field offices for service crews, including meter readers and line maintenance staff. Closing customer service offices is a common cost-cutting move. As the industry restructures, this trend is likely to continue, especially as utilities merge and consolidate.

4.2.2 Outage and Repair Service

When the lights go out, consumers call the local utility for service restoration. In most cases, the utility has limited liability for outages; however, they are often required to repair equipment that may be damaged, such as a VCR damaged due to a voltage surge or to replace items spoiled due to power outages, especially refrigerated foods. This liability is typically limited to a maximum dollar amount and may be restricted to residential customers.

4.2.3 New Connection and New Service Requests

The local utility is the point of contact for connection of new facilities and for expansion of existing services. Generally, utilities are fairly generous with service connections and expansions as new customers means new power sales and distribution revenues. There are exceptions, when the customer is required to compensate the utility for services.

- Customers that are not close to distribution lines are usually charged for costs that exceed "typical" connection costs. These may be prohibitive for remote locations. Some utilities may choose not to provide a line at all, and instead offer a remote power supply option, such as a solar photovoltaic system. A lot of remote areas fall between utility boundaries. In some cases, utilities may claim a remote customer is outside their service area to avoid the additional cost of serving them.

- The local utility is also the focus for interconnection of customer-owned or on-site generation, including distributed energy resources (DER). Standards and expectations for interconnection of DER vary widely and remain an ongoing subject for negotiation within the industry. Utilities have legitimate concerns about protecting the safety of their workers and other retail customers from "stray" voltage from DER devices that may be operating when a power line is supposed to be down. On the other hand, the restrictions utilities want to impose on owners of DER devices are often excessively expensive and potentially defeat the purpose of using DER for back-up power during outages.

- Some customers want to have service drops (connections to the distribution network) from 2 or more different substations to ensure a reliable power supply. This is typically a value-added (extra cost) service.

- Finally, customers that want the ultimate in system-supplied reliability may want to be connected directly to the high-voltage transmission grid. This requires a substation at the customer site, which can be expensive. This is also a value-added (thus extra cost) service, providing the utility even allows it.

4.2.4 Metering and Billing

Metering and billing are integral to the provision of electric service; in essence, the power meter is the utility's cash register. Modern utility meters are capable of many functions that could help customers manage energy more wisely. These new meters are significantly more expensive than traditional ones and usually require replacement of traditional meter reading and billing systems at considerable utility expense. As a result, some utilities stay with traditional meters to keep rates low. Large customers and customers with multiple locations can benefit from more modern metering. Unfortunately, the slow pace of adoption of advanced metering may limit the ability of these customers to upgrade or to take advantage of all the available features.

Similarly, some customers would like the ability to have all utility bills arrive or come due on the same day. Present utility meter reading practices are based on the utility reading roughly one-twentieth of their meters on each of the 20 working days in the month. Consequently, it is unlikely that bills from multiple locations will all arrive on the same day. Some utilities are addressing these markets with new, extra-cost products. There are also third-party billing firms that essentially take over the utility bill payment function for customers and, in turn, send the customer utility bills the way the customer wants them. For example they may consolidate into a single invoice, the bills for all utilities for all plants, including plants served by multiple utilities in different states.

4.2.5 Marketing

Utilities market electricity as a beneficial service (e.g., "live better electrically"), even in times of scarcity and high costs. When energy conservation is a lesser concern, they actively encourage new customers to locate in their service areas for economic development and to increase electric use to boost revenues. Many utilities have resource centers that are designed to showcase state-of-the art electric technologies to encourage increased adoption of electric uses and therefore electric sales.

4.2.6 Energy Efficiency and other Demand Management Services

Regulated utilities are often a source of information and advice for retail consumers on energy efficiency, efficient equipment selection, and similar support, including audits, rebates, discounts, and financing. Generally, these services are provided at the direction of regulators, not as voluntary programs. As a result, they are often designed to accomplish objectives that benefit the utility as well as the customer. In fact, services that benefit only the customer, not the utility, may be restricted by regulation or require customer payment.

4.2.7 Renewable Energy Resource and R&D Programs

Utility ratepayer funds are also often used to develop renewable energy resources, such as wind and solar power and to fund research that benefits electric utilities, such as research into power plant maintenance, transmission design, and automated distribution system operations. Much utility research is conducted collaboratively, where many utilities contribute a fixed share of revenues to be used for research by third parties, such as the *Electric Power Research Institute (EPRI)*. Some of these programs result in pilot and demonstration projects, such as installation and operation of a wind turbine or fuel cell in the utility system.

4.2.8 Public Benefits Programs

Electricity has been deemed to be an essential public service. Everyone is expected to have access to power to meet minimal health and safety needs. Not all customers have the financial wherewithal to be able to pay for the electricity they use. As a result, most regulators require utilities to collect a small fee from customers to operate programs that reduce the financial burden on low-income and elderly customers, such as home weatherization and low-income customer rate subsidies.

4.2.9 Wholesale Customer Services

Most large utilities also have wholesale customers they serve with power and transmission services. Typically, these wholesale customers are other, smaller utilities that sell the power to retail customers. In rare cases, wholesale customers may be retail customers in all but name due to prior regulatory agreements. Naturally, the level of service provided to these customers varies considerably from those for retail customers. Although wholesale customers can obtain power and transmission services from multiple suppliers in the competitive market, most utilities also offer bundled service under a regulated tariff. This tariff typically consists of the following:

- Generation at prices agreed to between the customer and the PUC. These may be cost-based, using the utility's generation as a basis, or they may be market based.

- Selected ancillary services, especially load following and load shaping services that match power demands in real-time. Most wholesale energy purchases are for power in blocks, such as 50 MW for 24 hours for 2 months. These are often take-or-pay deals where power that is not used is essentially forfeited to the supplier, but paid for nevertheless. Load following and shaping services exactly match variations in power use to generation. These services can be purchased in the wholesale market for a customer's entire load or only a residual that remains after a block purchase. Typically, load following services are quite expensive.

- Transmission and associated ancillary services are usually bundled into the transmission tariff. Generally, the State-regulated tariff for these services is higher than the FERC rates.

Additional services may also be available outside the standard tariff, such as substation services (transformation), multiple delivery points (service from more than one substation with additional meters for each), and maintenance of transmission facilities.

A Historical Sidenote -

The New York Blackout of 1965 and the Creation of NERC

The first major U.S. power blackout occurred in New York State in 1965. Industry response to this event radically changed the way utilities manage transmission and generation and laid the foundation for the equally radical changes to power markets and transmission management that began in the 1990s. The foundation for the New York blackout was built gradually over years of increased utility reliance on power imports from more and more remote locations, primarily in Canada. New York utilities had also begun to rely on generating reserves from adjacent utilities in case of emergencies. A power surge on the Canadian power lines caused protective circuit breakers to trip. The loss of power imports from Canada shifted demand to weaker lines from adjacent utilities. These lines also tripped due to the sudden increases in demand. These failures had a ripple effect that ultimately resulted in failures throughout the region and a day-long blackout.

The New York blackout of 1965 was a wake-up call to the power industry. The industry responded to the blackout by creating a voluntary, utility-managed reliability organization, the North American Electric Reliability Council (NERC).

NERC divided the nation into ten reliability regions, with each region covering multiple states (except for the Texas-specific Electric Reliability Council of Texas, ERCOT) (Figure 4.4). The largest council is the Western Systems Coordinating Council (WSCC), which covers the entire Western Interconnection, including 11 western states, two Canadian provinces, and the northern portion of Baja California in Mexico. The smallest is the Mid-Atlantic Coordinating Council (MAAC) covering New Jersey, the District of Columbia, and most of Pennsylvania and Maryland. Each reliability council promulgates system planning and operating criteria that are intended to ensure that each utility with generation or transmission assets builds and operates them in a way that allows system controllers to preserve bulk power reliability.

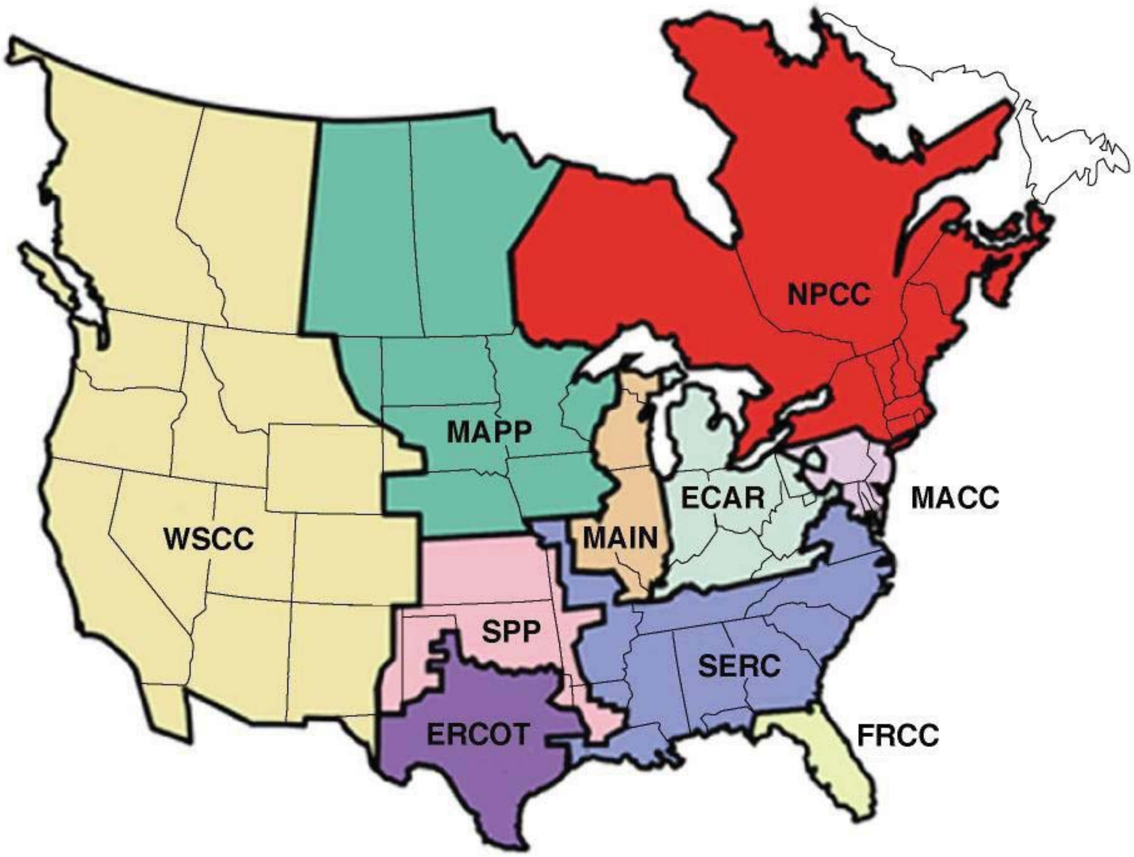
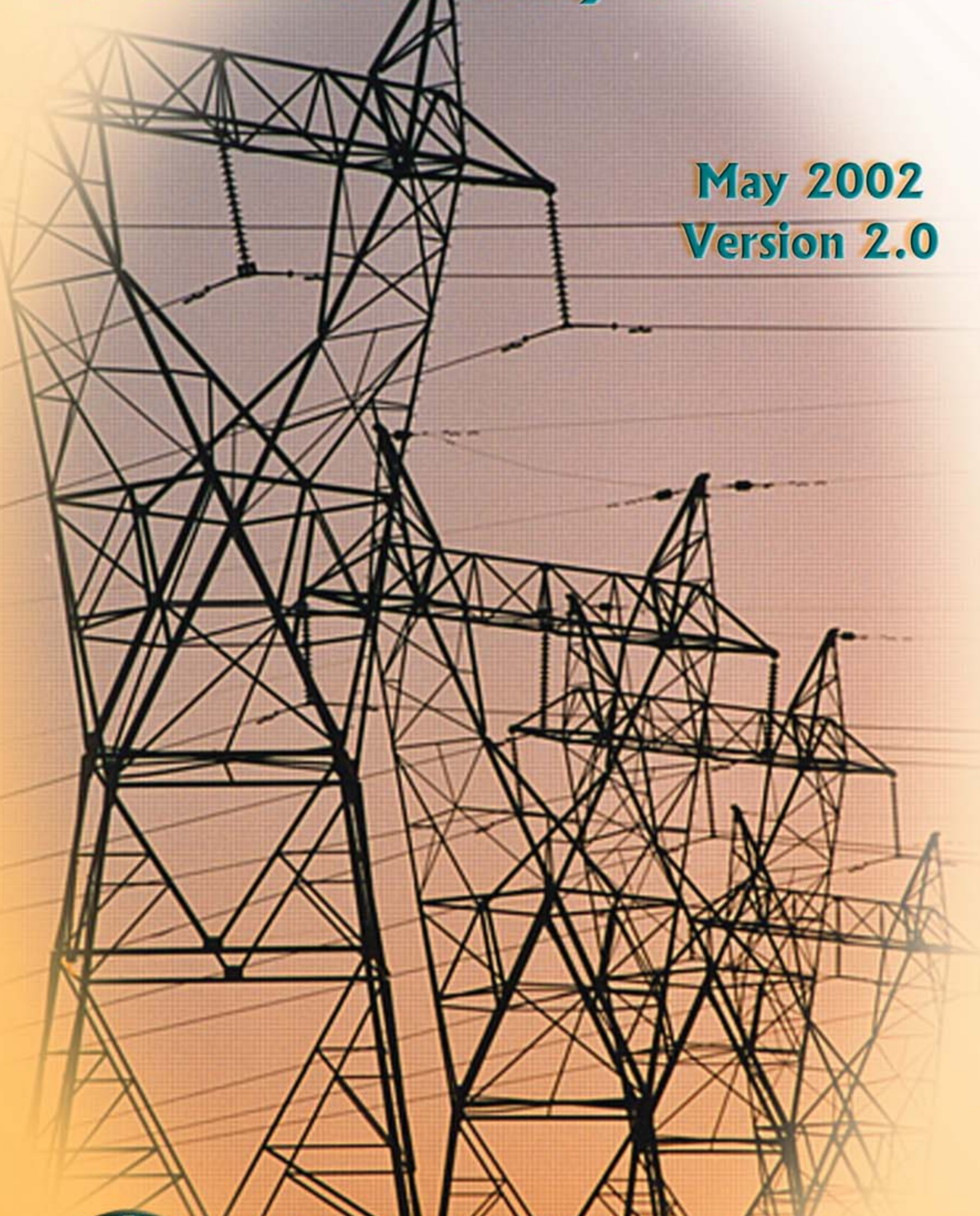


Figure 4.4. The 10 reliability regions of the North American Electric Reliability Council

Appendix 3

A Primer on Electric Utilities, Deregulation, and Restructuring of U.S. Electricity Markets



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A Primer on Electric Utilities, Deregulation, and Restructuring of U.S. Electricity Markets

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Foreword

A primer, by design, simplifies complex subjects. This primer is no exception. As a result, discussions of many topics may be more black and white than is the case in reality. Further, the process of selecting topics, and summarizing and editing text all introduce a point of view. Although every effort was made to present a balanced discussion, some readers may detect an occasional bias. This is unfortunate, but unavoidable. Although this document was thoroughly researched, errors in source material, interpretation, and editing are inevitable. That said, this is a dynamic document and comments and corrections are welcome. http://pnnl-utilityrestructuring.pnl.gov/electric/Primer/index.htm

Comments and suggestions can be posted via the Restructuring web site or can be sent to the author directly (Mike.Warwick@pnl.gov).

Summary

The objective of the Federal Energy Management Program is to provide Federal agencies and facility managers with timely and accurate information about electric industry restructuring to facilitate wise procurement of power and appropriate decisions about energy efficiency and other energy management investments in the face of industry change. This primer is offered as an introduction to utility restructuring to better prepare readers for ongoing changes in public utilities and associated energy markets. It is written for use by individuals with responsibility for the management of facilities that use energy, including energy managers, procurement staff, and managers with responsibility for facility operations and budgets. The primer was prepared by the Pacific Northwest National Laboratory (PNNL) under sponsorship from the U.S. Department of Energy (DOE) Federal Energy Management Program (FEMP). The impetus for this primer came from the Government Services Administration who supported its initial development.

Summarizing a subject this complex, even in the context of this simplified Primer, is challenging. Following is a list of highlights; these concepts are more thoroughly described in the following chapters. Terms are defined in an extensive glossary provided at the end of the report.

- The historic practice of providing consumers with electricity from a monopoly provider is not as efficient economically as it used to be due to the growth in independent power plant developers and competitive wholesale electricity markets. Giving retail customers the opportunity to choose their power supplier is expected to stimulate markets to reduce power costs and increase power products and services.

- There is a legacy associated with traditional utility practices that requires a transition period before power markets are truly open and competitive. The procedure and schedule for transitioning to competitive retail electricity markets is up to each state. Roughly half of the states have adopted a schedule for deregulation to date.

- Changing how retail consumers purchase power requires changes throughout the industry. Now that this process has been launched, the industry is restructuring itself to adapt to competition. The path forward is not fully known, but will involve existing utilities selling off their power generators as well, perhaps, as transmission lines. At a minimum, the operation of individual utility transmission lines will be taken over by third-party operators who will run them as a single, integrated system to serve competitive regional wholesale power markets.

- Retail power sales to consumers are being taken over by a variety of new power suppliers, many of which are subsidiaries of utilities based in other states. These new suppliers are not able to offer significant bill savings under most state transition rules (although they are offering new services including power from renewable resources). Most customers continue to receive power from the local utility on so-called default service rates that continue to be regulated.

- Competitive power markets are based on bids by generators into a single market, generally on an hourly basis. Market prices have been volatile. Prices are expected to continue to be volatile and

may become more so, unless new generation and transmission can be constructed to meet rising power demand. Fortunately, planned generation additions appear to be adequate to meet expected demand for the rest of the decade. Unfortunately, these new plants may not prevent spot shortages in certain areas or during high-use periods. Also, transmission construction is not keeping pace with either new plant additions or demand growth. This may result in increased transmission costs, outages, or both. This situation may continue for several years, as it takes roughly seven years to site and build new transmission lines.

- Utility-sponsored energy management programs are being phased out in the face of deregulation. Customer-funded programs operated by third parties are replacing many of these programs and new power suppliers are offering their customers' free energy audits and other energy management services, often for a fee. Some states have adopted utility fees that are used to fund energy-efficiency programs. An independent body, not the utility, often manages these funds.

- In the face of competition for electricity supplies, Federal agencies are required to solicit competitive proposals from alternative suppliers. The GSA and DESC aggregate the energy needs of Federal agencies in every state that deregulates. These GSA and DESC aggregation pools provide an easy energy purchasing option for individual Federal agencies and facilities.

- As deregulation and industry restructuring evolves, new issues will emerge. One of these is reliability. Another is the role customer-owned generators can play in managing volatile power prices.

- The best way to navigate the changing currents of utility deregulation and restructuring is to have a plan and an energy management team. It will take some work to pull together an Energy Management Team and develop an Energy Plan or Strategy, but this will pay off in the long run.

Up-to-date information on the status of deregulation in each state and updated versions of this primer are available on the FEMP restructuring web site:
http://pnnl-utilityrestructuring.pnl.gov/electric/Primer/index.htm

If you find this primer to be of value or if you have corrections, comments, or criticisms concerning this primer, restructuring, or FEMP, please send them to us via the web site, or to the author directly (Mike.Warwick@pnl.gov).

Acronyms

BTU	British thermal unit
COB	California-Oregon border
CCCT	combined-cycle combustion turbine
CT	combustion turbine
DESC	U.S. Department of Defense's Defense Energy Service Center
DOE	U.S. Department of Energy
E&P	exploration and production
ERCOT	Electric Reliability Council of Texas
EWAG	exempt wholesale generators
FERC	Federal Energy Regulatory Commission
FOB	freight on board
FPC	Federal Power Commission
G&T	generation and transmission
GSA	General Services Agency
GW	gigawatt
IGCC	integrated gasified combined cycle plants
IOU	investor-owned utilities
IPP	independent power producers
ISO	Independent System Operator
ITC	independent transmission companies
KWh	kilowatt hour
MAAC	Mid-Atlantic Coordinating Council
MCP	market clearing price
MMP	market marginal price
MW	megawatt
NE Pool	New England Power Pool
NERC	North American Electric Reliability Council
NY Pool	New York Power Pool
OH	operating hour
PBR	performance-based regulation
PJM	Pennsylvania, [New] Jersey, and Maryland Pool

PMA	DOE's power marketing administrations
PNNL	Pacific Northwest National Laboratory
POU	publicly owned utility
PSC	Public Service Commission
PUC	Public Utilities Commission
PUHCA	Public Utility Holding Company Act
PURPA	Public Utility Regulatory Policies Act
QF	qualifying facilities
RPS	renewable portfolio standard
RTG	Regional Transmission Group
RTO	regional transmission organization
TOU	Time-of-use
TVA	Tennessee Valley Authority
USPS	U.S. Postal Service
VA	Veterans Administration
WSCC	Western Systems Coordinating Council

Glossary

A

Access Charge or Wires Charge
A fee charged to an electricity supplier, gas supplier, or long-distance telephone provider (or to the customers of such companies) for access to a utility company's distribution system (the pipes or wires through which the utility supply moves, or the telephone lines owned by the local telephone company). It is a charge for the right to use another company's equipment and systems. The fee is generally set by state regulators at cost-based rates. For example, California electricity customers can purchase electricity from a power supplier of their choice. This supplier must arrange to transport the power over the local utility’s wires. To do so, they must pay an access charge (also called a wires charge). In most deregulated states, the power supplier can bundle this charge into a single consumer bill. In a few states the consumer pays the access charge in a bill that is separate from the power bill. *See also Wires Charge.*

Affiliate
A company that has the same owner as another company. For example, a company may have a separate company in the power plant development business. The parent company owns both this power developer and the local utility. When regulated utilities purchase or form subsidiaries they have to get approval from regulators. Another way to own several different companies is for a utility to form a holding company. Holding companies facilitate ownership of more affiliates, but are regulated at the Federal (rather than state) level by the Securities and Exchange Commission. They are also restricted under the Public Utility Holding Company Act of 1935 (PUHCA).

Aggregator
An entity that brings customers together to buy electricity in bulk, in order to increase customers' buying power. Aggregators can serve homes, businesses, or entire communities. They facilitate the purchase of power but are not the sellers. Retailers, customers, and brokers may also act as aggregators. It is assumed that the purchase of a large quantity of a commodity will attract more favorable bids than small ones. Commodity price savings from aggregation have been small thus far. However, aggregation results in significant savings in procurement costs, as only one agent is needed to execute a procurement on behalf of all participants.

A public aggregator is a unique form, established by a city, town, or county to purchase electricity in bulk for its citizens in order to increase their buying power. Public aggregators resemble consumer-owned utilities in that they are formed to reduce costs for consumers. However, aggregators are not utilities and do not distribute power to end users.

Allocation
Generation may be divided up, or allocated, among purchasers for a variety of reasons, such as to link costs, risks, and benefits for projects developed by multiple sponsors. Power projects developed with public funds most commonly allocate the output (and cost recovery) to specific beneficiaries. For example, power from the Hoover Dam, which was built with Federal funds, is allocated to specific Western utilities that are customer-managed and serve predominately rural areas.

Alternative Energy Supplier
A supplier of energy that is not the company providing distribution and transmission services to the customer. Alternative suppliers may be brokers (agents that are middlemen between energy producers and consumers) or marketers (agents that own the energy they are selling to consumers). Aggregators are not alternative suppliers as they only aggregate customer demand, not supply.

Ancillary Services
The electric power system is dynamic. It responds to electricity use by customers. As a result it must be able to adapt rapidly to changes in use. Deregulation of wholesale generation and transmission markets resulted in unbundling of individual elements of power supply into discrete services that are ancillary to, but necessary for, a reliable power supply, so-called “ancillary services.” These include things such as generating reserves that are not specifically purchased by retail power users, but are included in the retail price of power as they contribute to power system reliability. Ancillary services are critical components of wholesale power trades, but are assumed to be part of the purchase in retail power transactions. Wholesale power suppliers have to make arrangements for ancillary services as part of the process of conducting transactions with retail consumers. Retail customers should clarify that this is the case, just to be sure. Similarly, ancillary services are not the same as the value-added retail services that are often included with retail power sales, such as free energy audits.

B

Back-Up Service
Customers with their own resources may have to provide resources in reserve to ensure against a failure of the primary resource. Typically, this is only required of a customer with on site generating equipment. These customers may require back-up supplies from the local utility. Without this back-up option, the customer would either have to maintain redundant generation on-site or risk power outages if on-site equipment were unavailable or inadequate to meet on-site power needs.

Balancing
Power demand and supply must match on a moment-to-moment basis. Unfortunately, it is impossible to accurately predict demand that frequently. As a result, a portion of generation capacity is set aside specifically to fill-in any gaps to make sure the system stays in balance. A key part of system operation is for suppliers to provide accurate estimates of production, hour-by-hour as well. Sometimes they err. When they do, generation has to come from someone else

to make up the shortfall. This also comes from generation used for balancing. When generators err in their estimates, they have to pay for the costs of balancing. These charges can add up for generators that are consistently wrong. Unfortunately, estimate of the power from intermittent renewable resources, like wind and solar, are often wrong and balancing costs may make them uneconomic.

Base Load
The minimum energy level a company must provide to its customers on a constant basis. The exact amount varies each day because aggregate customer loads vary from day to day and month to month. For example the base load for low electricity use in the spring and fall months is lower than in the winter and summer. Consumer loads mirror utility generating requirements. As a result, the phrase "base load" also is used to characterize customer needs. Specifically, power suppliers are interested in each customer's base loads in order to identify the minimum quantity of power to sell. Both generators and power suppliers also characterize loads in terms of peak load, the maximum amount of power needed.

Base Load Plants
Plants that run at full capacity year round to meet a utility's base load are called base-load plants. For base load plants, utilities select plants with the lowest generating costs, construction, and operating costs. Traditionally, base-load plants were fueled with coal purchased in very large volumes on long-term contracts.

Bid-Ask Negotiations. See Commodity Market.

Bid-Offer Auctions. See Commodity Market.

Bid Stack. See Dutch Auction.

Bright Line
A distinction the industry is trying to draw between distribution and transmission. Such a line is needed to clarify FERC and state jurisdiction over power line regulation and rates. FERC normally has jurisdiction over high-voltage (750, 500, 230, and 115 volt) transmission lines while the states have jurisdiction over low-voltage (69, 34, and 13 kilovolt) distribution lines.

British Thermal Unit (BTU)
This is the standard unit for measuring quantity of heat energy, such as the heat content of fuel. One BTU equals the amount of heat necessary to raise the temperature of one pound of water by one degree Fahrenheit. There are 1.03 million BTUs in 1 Mcf (an Mcf is a unit of volume meaning 1,000 cubic feet). There are 3,412 BTUs in 1 kilowatt hour.

Broker
A person or group that arranges for the purchase and sale of electricity, transmission, and other services between buyers and sellers, but does not take title to the power in the transaction. Energy brokers act just like a real estate or insurance broker. They earn a commission on the sale of energy, not a profit on the mark-up. This contrasts with marketers, who own title to the energy they are selling and make a profit based on selling the energy for more than they paid.

Bulk Power Market or Wholesale Power Market
The bulk power system consists of the generation and transmission system and the wholesale financial transactions associated with power and transmission transfers on the system. It includes wholesale purchases and sales of electricity, transmission reservations to wheel that power, and potential interactions with power pools and independent system operators (ISOs). Access to the bulk power market is reserved for wholesalers, including power producers, power retailers, and a few very large direct-use customers. Some Federal agencies have access to the bulk power market at selected sites. *See also Grid, Transmission System.*

Bundled Service
Before deregulation, customers received electric generation, transmission, distribution, and related support functions as a combined service. After deregulation the same services are provided, but each service is individually priced (unbundled) and may be provided by a choice of suppliers. Although all component services are unbundled in rates, only a few are presently subject to choice. The most common services available for competition are power supply, value-added services like energy efficiency, and metering and billing.

Buy-Sell Agreements. See Net Metering.

C

Capacity
The physical capability of a pipeline, power plant, or other facility. In the electric industry, generating capacity is measured in terms of kilowatts (1,000 watts) or Megawatts (1,000 kilowatts) and transmission capacity is measured in kilo-volt-amperes (kva). In general conversation, capacity is used to indicate a maximum; for example "The capacity of the generating plant is 500 Megawatts (MW)." The adjective maximum is assumed.

Capacity Market
Power demand varies from day-to-day and season-to-season. The power system has to have enough capacity in it to provide for the maximum demand for both power and delivery. Since this capacity is only used during peak periods, it may sit idle the rest of the time. Nevertheless, it has to be paid for. Unfortunately, simple kWh billing doesn't reflect the fact that some generation, transmission, and distribution capacity is just sitting in reserve for peak demand periods. Utilities try to recover those costs through a "demand charge." Prior to deregulation, retail customers paid the local utility for energy (kWh) and demand (kW) based on the costs of the utility's generation. Now that wholesale markets are deregulated, the utility may purchase capacity, as a separate commodity, from a competitive market that trades just capacity (or access to stand-by generation).

Capital Investments or Utility Assets
These include generating plants, transmission and distribution systems, and other infrastructure such as office buildings. Utilities raise capital for investments by borrowing from lenders and issuing stock to investors. Investor-owned utilities earn a rate-of-return for capital they invest in utility facilities. These assets are called the rate base. Utilities do not earn a rate-of-return on normal expenses, such as salaries, maintenance, and fuel.

Captive Customer
A customer who, because of remote location or lack of competing providers, has no alternative to purchasing service from his or her local utility company.

Cherry-Picking
The practice of pursuing desirable customers and ignoring less desirable customers. The term is commonly used in energy markets to describe a power supplier's tactic of trying to get the business of the largest users while ignoring small ones. One way small customers can thwart this strategy is to aggregate with other small customers so they resemble a large customer.

Cogenerator
A facility that simultaneously produces electricity and another form of useful thermal energy (such as heat or steam), used for industrial, commercial, heating, or cooling purposes. Using the "waste" heat instead of burning more fuel increases the thermal efficiency of cogeneration projects. As a result, cogeneration is environmentally preferable. Because the use of the waste heat is closely tied to a specific application, the cogeneration plant is almost always located at the customer's site. The demand for waste heat at that site typically drives the design, and size, of the cogeneration plant. The plant may not be able to provide all of the power needed at the site. Although cogeneration plants may be subject to siting and emissions regulations, all customers have the right to install cogeneration facilities. In other words, you are not required to prove a need for the power and local utilities cannot stop you from installing cogeneration. This is not the case with some other kinds of onsite power plants.

Collar. See Price Ceiling.

Combination Utility
Generally, this refers to a utility that provides both electricity and natural gas to retail consumers. Many electric utilities are merging with retail gas utilities to become retail-focused combined utilities. This trend is called convergence.

Combined-Cycle Combustion Turbines. See Gas Turbines.

Combustion Turbines. See Gas Turbines.

Commerce Commission. See Public Utility Commission.

Competition
A market structure in which two or more companies compete for customers' business. To be effective, competition requires that no company be able to dominate the market. This ability is called market power and is critically reviewed during deregulation and merger proceedings involving present retail utilities. Effective competition should also allow choice on the basis of price without the distorting effects of stranded costs and other, non-power related, fees and surcharges.

Competitive Power Supplier
A competitive power supplier (also known as an electricity supplier, power producer, power generator, power seller, power marketer, or power broker) is a company, person, or organization that sells electricity. Some suppliers generate and sell their own power, while others buy it and then resell it. In any case, the electricity sold by a competitive power supplier is delivered to your home by your local distribution company. How much a competitive power supplier charges for electricity is set by the individual supplier. All customers pay the local distribution company the same rates for local delivery.

Competitive Retail Electric Service
This refers to a situation in which consumers purchase power from competing electricity-suppliers.

Conservation
Reducing a customer's use of water, gas, and electricity to decrease the need to produce and/or transport these commodities. Conservation reduces consumer utility costs and environmental impacts from utility commodity development and distribution.

Congestion
When transmission is inadequate to meet local demand it is called congestion. Power grids were originally designed to provide adequate transmission capacity for local generation plants to provide power to customers located in the vicinity of the plant. In competitive power markets the demand for low-cost power increases and low-cost power may be sent great distances to reach consumers. The existing transmission system cannot accommodate all of that low-cost power flowing to a few high-volume markets -- the result is congestion. Congestion is relieved by operating higher-cost generating plants to run near the high-demand areas. This works because when local generation is used, transmission isn't needed, so there is less congestion on the transmission grid. The costs associated with congestion relief are passed on to consumers, often only to those on-line during the congested period. Congestion is managed by the utility control center in the area where transmission is congested. In the transition to competitive markets congestion is being managed by ISOs.

Contract Terms
Contract terms are the agreements between a competitive power supplier and a consumer specifying the length of service and whether penalties exist for early termination. Consumer expectations of power supply and reliability were protected by state regulators prior to deregulation. After deregulation, some (but not all) of these expectations may be subject to negotiation. For example, the power supplier may require the customer to reduce loads when power supplies are very expensive or in short supply.

Control Center. See Grid.

Cooperative (Co-op) Utility
A type of utility in which the customers are also the owners. Co-ops are not-for-profit institutions, which reduces costs to end users. Co-ops are managed by a Board of Directors elected by member customers. Co-ops are common in rural areas that are expensive to serve because of the long distances between users. The Federal government contributes in various ways to rural cooperatives to reduce costs to individual owners and users through the Rural Utility Services agency.

Core Market
This refers to utility customers who do not have the option to choose among competing utility suppliers and who are therefore captive to a single supplier. Customers who comprise a utility's core market are also referred to as captive customers. The term core customer comes from the natural gas industry. Natural gas utilities divide customers into two types, core and non-core. Core customer refers to a retail natural gas customer that is too small to tap into the wholesale gas market; the local gas distribution company is obligated to serve this customer. In contrast, non-core customers have sufficient size, expertise, and buying power to negotiate for gas supplies in the wholesale market. The local gas utility is not obligated to provide gas for non-core customers, especially if it interferes with supplies for core customers. Natural gas demand is greatest in the winter when residential heating demand is high. If gas supplies cannot be obtained to serve all customers during these periods, the gas company can curtail deliveries to non-core customers. Natural gas markets were deregulated for large, or non-core, customers over 10 years ago. These large customers can now seek out gas supplies directly from the wholesale market.

Electric utilities do not have a similar distinction between core and non-core classifications for customers. Large retail electricity customers are not allowed to tap directly into wholesale markets. Before deregulation, essentially all customers were core customers. After deregulation, all customers are essentially noncore customers, except those that are "captive" because of remote location or lack of local competing providers.

Cost-of-Service (COS) Pricing
This is a method of allocating the costs of providing service to individual customers. It contrasts with value-of-service pricing. Value-of-service pricing is used in competitive markets, where sellers price items at "what the market will bear." Price regulation was imposed on regulated utilities to ensure that utilities are only priced at cost, not at what the market will bear. The assumption was that competitive pricing could be so high as to restrict access to utilities to the

wealthy. As a result, cost-of-service pricing was used to set utility rates. Under COS regulation, utilities are allowed to recover reasonable costs plus a rate of return on investment. The resulting rate is expected to be less than what it would be with competitive suppliers. Because the costs to serve customers varies, COS attempts to correlate utility costs and revenues with the service that is provided to each customer, typically as one customer of a class of customers. As a result, customers in different classes are charged different rates.

Cramming
Adding services and charges to customer bills without the customer's knowledge or consent. Cramming has been a problem with telephone deregulation and steps are being taken by states to prevent it under energy deregulation.

Customer
There are two utility perspectives on what constitutes a customer. The historic view is based on the energy meter: one meter equals one customer; i.e., a firm with 10 meters would be viewed as 10 customers instead of one bill payer. This view is based on cost-of-service rate making, where utility charges are based on what it costs to serve each meter. This perspective prevents utilities from offering customers with multiple meters a quantity discount, because that would be discriminatory and violate cost-of-service rate-making principles. The advent of competition in the utility industry has encouraged utilities to view each customer as one bill payer regardless of the number of meters they have and to curry favor with customers on the basis of total consumption rather than use per meter. This is the more traditional marketing definition of customer.

Customer Charge
The first component, the “customer charge” is designed to cover customer service costs, including metering, billing, and providing marketing and customer service facilities. The customer charge” varies for each customer class and is generally a flat fee for all customers in the class.

Customer Choice
The ability of consumers to choose their suppliers of natural gas or electricity without respect to utility service area.

Customer Class
Typically, utilities divide customers into three classes (residential, commercial and industrial) for rate-setting purposes. It is not unusual for utilities to further group customers with similar service requirements into subclasses (e.g., residential space-heating customers). Commercial and industrial customers are often called general service customers (small and large respectively). Customers are divided into classes based on use characteristics such as service voltage, maximum demand, average use, and total bill. Many states require special treatment for residential and farm customers based on their comparatively low consumption levels. In those cases, the residential and farm classification is based on customer type rather than other characteristics, even when the customer is a large energy user. With this exception, customers are generally classified based on energy use at each individual meter. As a result, a single firm with multiple meters may have different rates for each one. *See also Cost of Service.*

Cycling
The process of starting up and shutting down a plant. The costs of cycling varies depending on the plant type.

D

Daily Peak
The maximum amount of energy or service demanded in one day from a company or utility service. *See also Peak Demand, Capacity, and Base Load.*

Day-Ahead Market. See Power Exchange.

Declining Block Rate
A declining block rate provides consumers with an incentive to consume more power by reducing the cost per kWh as total use increases. Both declining block and inverted rates can have multiple blocks. The simplest form consists of two blocks. However, three or four blocks, each with a different kWh charge, are not unusual. This kind of rate design requires regulation; it would be impossible to implement in an open and competitive market. *See also inverted rate.*

Default Service
Prior to deregulation, the local utility was required by law or regulation to provide service to **all** customers in its service area. (This principle is also referred to as universal service.) Utilities were even required to provide service to customers who were costly to serve due to their location or uneconomical to serve because of poor credit. After deregulation, competitive suppliers are expected to shun these customers. As a result, many state deregulation plans include provisions for default service to provide customers with a continuous power supply through their distribution company when, for whatever reason, they are not receiving power through the standard offer service, an aggregator, or a competitive power supplier. Where default service is available, customers are eligible to receive default service at any time and may stay with this service indefinitely, though it may not be the most cost-effective means of buying power. Not all states have provisions for default service.

Delivery Service Charges. See Distribution Charge.

Demand
A measure of customer or system load requirements over a measured period of time. Demand is used to establish requirements for both generating and transmission capacity. In economic terms, this is the inverse relationship between the price of a good and the quantity of the good that is demanded by consumers (high prices drive down demand and vice versa). Demand is for consumers what capacity or base load is for suppliers. *See also Base Load, Capacity, Daily Peak, Load, and Peak Demand.*

Demand Charge
This is the amount charged to a customer (or customer class) to reflect that customer's use of a utility during a specified time interval. In cost-of-service analysis, the demand charge is usually based on the fixed costs associated with serving customers. It is levied based on the maximum demand over the interval and is used to pro rate the cost of production and transmission capacity equitably across all customers. For example, if it costs $10 to have a kW of generating capacity available, customers would be charged $10 for each kW of demand (peak consumption) as a demand charge.

Demand Meter
Peak power use is monitored with a demand meter, a kilowatt-hour meter with a separate demand register. Peak demand as registered by the demand meter is billed as a separate line item on the power bill. Demand meters are more complex and expensive than kWh meters. Demand metering functions are built into time-of-use and real-time meters. In fact, time-of-use and real-time meters are often installed primarily for demand, rather than kWh, metering. Similarly, demand charges may also vary on a time-of-use or real-time basis.

Demand Register. See Demand Meter.

Demand-Side Management (DSM)
Demand-side management refers to a range of activities that change the way energy is used in terms of time of day and quantity. The goal of DSM is to reduce demand; from the supplier's point of view, this either reduces the cost of service or the profitability of service. Customers implement DSM measures to reduce utility costs, although the DSM measure may not reduce utility use, en toto. A demand-side management program is the planning, implementation, and monitoring of electric activities that are designed to influence customers' use of electricity in ways that will produce desired changes in a supplier's load shape (i.e., changes in the time pattern and magnitude of a supplier's load). According to the Electric Power Research Institute (EPRI), there are six DSM objectives: load reduction (conservation), load shifting, peak-clipping, valley-filling, load growth, and flexible load shape. Utility programs falling under the umbrella of DSM include load management (direct load control), energy efficiency, energy storage, and innovative rates. DSM programs can be implemented through energy audits, fuel switching, rates, loans, or incentive payments. DSM objectives can also be accomplished through non-utility programs that introduce higher efficiency standards or transform markets by introducing more efficient products. *See also Efficiency Services and Load Management.*

Deregulation
The process of removing price regulations on price regulated utilities. In general, only price regulations are removed, all other aspects remain regulated. The term deregulation is used outside the United States to refer to the sale of government-owned or controlled assets to private-sector operators. U.S. based utilities are not government owned to start with so there is no need to go through this phase of deregulation. Under deregulation, generation is separated from transmission and distribution. Local utilities are still required to provide transmission and distribution, which remains regulated, but the generation of power has been deregulated, rates are no longer fixed and power generators compete for customers. Deregulation and industry restructuring are often used interchangeably; however, it is useful to draw a distinction between

the two. Deregulation is what regulators do to utilities. Restructuring is the industry-driven adaptation to deregulation, including preparing for competition, seeking new products and markets, and merging with other firms. Restructuring is what the industry does to itself. *See also Restructuring.*

Derivatives
Products such as options and futures offered by financial markets to buyers and sellers. Because they derive their value from trades in markets in which a person does not need to either produce or use the item they trade, they are called derivatives. Participants in these commodity markets are called speculators, although trader is a more accurate term. Unfortunately, derivatives have gotten a bad name because of they way some people used public funds to speculate. A typical use of a derivative is to "hedge", or fix, the price of a commodity that is expected to vary in the market. For example, roughly 30% of the operating cost of an airline is jet fuel. If jet fuel costs doubled in the market, the airlines would need to increase ticket prices to compensate. That would discourage air travel. As a result, airlines typically buy a derivative (an option or future) that lets them buy fuel at a fixed price in the future. If fuel costs are higher than that price, the airline doesn't use the derivative to buy the fuel. Instead, it sells it for the difference between the price it purchased the derivative for (the "option" price) and the current market, or "strike" price. Now it has the extra money it needs to pay the higher fuel costs, so it doesn't have to raise ticket prices. If, on the other hand, fuel prices fell below the option price, the airline would have spent money on a derivative that it didn't need. This extra expense will be tacked on to ticket prices also. Accordingly, choosing an hedging strategy (how many derivatives to purchase and when) is a major business decision. People usually get into trouble when they don't have a good hedging strategy (called a "risk management strategy"). Often, they buy more derivatives than the need to hedge their risk. Then, when the market moves against them, they have losses that they cannot justify based on a sound analysis of risk.

Direct Access
The ability of a retail customer to purchase electricity directly from a competitive power market and then have the local distribution company deliver the power over its transmission and distribution system for a fee. (Also known as customer choice, deregulation, retail wheeling, or open access). *See also Wheeling, Open Access, and Transmission Charges.*

Disclosure
A requirement that competitors in an electric market provide generation source information, environmental impacts, and other information on price and conditions of service. Some states have adopted rules that require suppliers to make uniform disclosures to consumers.

Disclosure label
A disclosure label is a standard format of information required by state regulators detailing a competitive power supplier's prices, the terms of its contract with a customer, the types of power sources used, its air emissions, and its labor practices. The same format is to be used by every supplier and distribution company to make it easier to compare the various offers. The format of the label is dictated by regulators. However, not all states have disclosure requirements and virtually none of the states use the same standards or use the same label format.

Dispatch
To start and run a plant. *See also Production Costs.*

Distributed Energy Resources. See Distributed Generation.

Distributed Generation
Generation sources (also known as distributed energy resources) that are disbursed throughout the grid and located at individual customers' sites. This is in contrast to traditional sources of generation, typically a few large generating plants located centrally, often at some distance from users. Advances in fuel cells and other generating technologies are making the concept of distributed generation increasingly economical for end users. Another example of distributed generation is a large industrial facility that uses thermal power from process heat to generate both electricity and thermal energy. Individual power generators can be deployed, on-site, to supplement or replace power from the utility grid. Distributed generation devices can also replace existing emergency generators and universal power supply (UPS) systems for critical medical and computer needs.

Distribution
Electricity is generated and transported at higher voltages than it is used by all but the largest industrial customers. It is more efficient to transmit electricity at higher voltages. As a result, electricity is not "stepped down" to consumer voltage levels until it is close to the point of use, namely individual homes and businesses. The delivery of electricity to a retail customer's home or business through these low-voltage lines is called distribution. Transmission is the transportation of electricity at very high voltage levels, generally for long distances.

Distribution Charges or Delivery Service Charges
Part of the basic service charges on every customer's electric or gas bill for delivering electricity or natural gas from the distribution company to a customer's home or business. This charge will vary according to how much it costs to serve a customer in each class. Generally, distribution charges are based on how much energy is used. Historically, larger customers paid for distribution costs through a demand charge, whereas smaller customers paid a simple kWh fee. This may change after deregulation.

Distribution Company (or Disco)
The term "utility" has lost some of its meaning in the face of deregulation. Formerly, utilities were assumed to be firms that provided power to consumers. After deregulation many states prohibited formerly integrated utilities from selling power to customers. Instead, they were restricted to simply transmitting or wheeling power between power sellers and retail power buyers/customers. To acknowledge this change, the phrase "distribution company" was introduced to identify the former electric utility company as the company that delivers electricity to your home or business. The distribution company will continue to maintain local wires and poles, and restore your power in the event of an outage. It will continue to read your meter, but it may not be the company that either prepares your bill or collects payment for power use and delivery.

Divestiture
Divestiture occurs when a utility company sells one of its services or functions to a new company. Divestiture is often used by regulators as a means to mitigate an incumbent utility's market power. In this case, the incumbent utility sells off some or all of its generating plants so that it no longer has market power. Market power is the ability to set prices in the market, thereby frustrating competition among suppliers.

Dutch Auction
The bidding method used in auctions to set prices. The California Power Exchange (PX) uses a Dutch auction to set prices for power and ancillary services. All suppliers bid into the auction at the same time, but none knows the others' bids. Bids are put in a bid stack, lowest to highest, by the PX. Supplier bids are accepted on a lowest-cost-first basis up to the point that sufficient power has been purchased to satisfy demand. Bids above this point are rejected. The last bid accepted that satisfies demand sets the marginal cost of power or market clearing price (MCP) for power for the bid period, usually a one-hour period. (The market clearing price is also known as the market price, the marginal price, or the market marginal price.) Under a Dutch auction, the last accepted bid establishes the price paid to all vendors, regardless of their actual bid. In other words, if the last amount of energy needed to satisfy total demand was at a price of 4 cents/kWh, all winning supply bidders would be paid 4 cents/kWh even if the bids they submitted were less than 4 cents. Bids above 4 cents would be rejected and those vendors would receive no payment. The use of the term Dutch auction in California is at odds with some other definitions.

E

Efficiency Programs or Services
Efficiency programs are a specific variety of DSM services aimed at reducing a customer's total energy use without affecting the delivered energy service. Programs could include installing insulation and weather stripping and converting to compact fluorescent light bulbs. These services may be offered by energy-efficiency companies, distribution companies, aggregators, and competitive power suppliers. Although some of the companies offering efficiency programs may charge a higher rate for electricity, it is possible that by reducing your energy use, you could save more money than if you bought electricity at a lower rate without these programs. Energy efficiency programs also help reduce the harmful environmental impacts of power production and use. They also help Federal agencies meet the efficiency goals of Executive Order 12123.

Electric Cooperative
A member-owned electric utility company that generates or purchases wholesale power, arranges the transmission of that power, and distributes the power to serve the demand of rural retail customers on a non-profit basis. Rural electric cooperatives were created to bring electricity to rural areas that were not being served by for-profit utilities because of the high cost and low customer density. *See also Cooperative and Investor-Owned Utility.*

Electric Generation
Electricity can be generated through a wide variety of processes, although far and away the most common is by the rotation of a generator shaft, or rotor, through opposing magnetic fields. Shaft rotation induces the flow of electricity in the generator. An external energy source is required to rotate a generator shaft, and that can come from a wide variety of sources. There are four major generator designs based on the primary source of energy, or prime mover, used to turn them. These are water turbines, engines, gas turbines, and steam turbines. Water turbines in hydropower plants direct water flow through dams containing turbine blades attached to one end of a generator rotor. When the water turns the turbine, it also turns the rotor and electricity is generated. Steam turbines are turned by steam from water heated by heat from controlled nuclear reactions or from the burning of fossil fuels. Fossil-fired generators vary in efficiency from 30 to 65%, i.e., a 30% efficient plant uses over twice as much fuel as a 65% efficient one. Modern plants tend to be much more efficient than older ones.

Electric System
A phrase used to describe the electric generation, transmission, and distribution components as one complete, integrated system. *See also the Bulk Power Market.*

Electricity Broker
An electricity broker is a company or individual that facilitates the sale of power to customers, but does not take title to the power and is therefore not the seller. An energy broker earns commissions like a real estate or insurance broker or agent. This contrasts with an energy marketer that actually owns the energy it sells and makes a profit on the mark up between purchase and sales price.

Electricity Generator
An electric power generating plant or the owner or operator of such a plant or plants. When reference is made to a plant, the term usually refers to a single or specific plant. For example, "When the generator trips off-line…" When reference is made to a source of supply (the person or firm selling power) the term is generally not plant specific but refers to the power resources available to the plant owner, typically multiple plants and/or power contracts. For example, "When the generator sells power to the PX …"

Embedded Costs
This refers to the historical costs of all the capital assets (equipment and facilities) used in an electric utility's system. Each asset goes on the books at its initial cost. Capital assets are depreciated over time, so the value carried forward on the books declines over time. The resulting value is called "book value." Book value for an asset may be less than the value of the asset if it were sold on the open market, i.e., the market value. One of the benefits of cost of service regulation is that current prices are tied to the low embedded costs of existing assets. Generally, this means power costs are lower than they would be in an open market.

Energy, U.S. Department of (DOE)
An agency created by the federal government in 1977. It provides information to achieve efficiency in energy use, diversity in energy sources, a more productive and competitive economy, improved environmental quality, and a secure national defense. Before 1977 these functions were provided by various predecessor Federal organizations. Most states have an agency, sometimes called the state energy office or energy department, tasked with some of the same missions, especially energy conservation. Also included under the U.S. DOE umbrella are the federal power marketing administrations, oversight of the Tennessee Valley Authority, and the Federal Energy Regulatory Commission.

Enhanced Services or Value-Added Services
Any service offering that is not essential to the delivery of basic service. Historically this included extra transformation of power (stepping-down the voltage), power quality monitoring and improvements, energy audits, energy efficiency services, facility maintenance, and so on. Prior to deregulation these services were often provided for free or at a subsidized price. In the post-deregulation world, utilities are offering a long list of services on a fee basis as a means of increasing the products they can sell to customers. With few exceptions, utilities will not offer these services for free after deregulation.

Exempt Wholesale Generators (EWAGS)
In an effort to diversify domestic power supplies in the wake of the oil embargo of the 1970s Congress, in 1978, passed the Public Utility Regulatory Policies Act (*PURPA*) allowing non-utilities, called independent power producers to build power plants and requiring local utilities to purchase the output on terms favorable to developers. Eventually, the ability of the IPPs to provide power, increasingly based on natural gas as a fuel, outstripped the willingness of local utilities to buy it. Consequently, Congress created new categories of power producers, ultimately authorizing utilities to enter the business as *exempt wholesale generators, or EWAGS*.

F

Federal Energy Regulatory Commission (FERC)
A federal agency that regulates the price, terms, and conditions of all interstate wholesale energy and transmission transactions, natural gas as well as electricity. For example, FERC approves and enforces the transmission rates that utilities charge each other to move power through the bulk power market. FERC has led the deregulation of natural gas and electricity prices by requiring open access to gas pipelines and electric transmission systems. FERC also licenses and inspects private, municipal, and state hydroelectric projects and enforces provisions of the Federal Power Act, such as requests to use transmission facilities by third parties. FERC is a five-member commission within the U.S. Department of Energy that regulates wholesale transactions. FERC commissioners are appointed by the President.

FERC Mega Notice of Public Rule Making (Mega NOPR)
Reacting to industry innovation, FERC requested comments from consumers and industry about new ways of structuring gas transportation in what it called a Mega-Notice of Proposed Rulemaking, or Mega-NOPR, in July 1991.

FERC Orders 436 and 500
FERC issued a series of Orders aimed at introducing competition into the pipeline business while retaining control of the transportation function. The first of these, Orders 436 and 500, were issued in the late 1980s. These orders allowed consumers to negotiate prices directly with producers and required pipelines to transport the gas resulting from these negotiations. These rules maintained the traditional role of pipeline owners as marketers (buyers and sellers) of natural gas, but allowed producers to secure access to pipelines for their own use. This allowed producers to balance supplies across production regions. These Orders stimulated innovation in pipeline tariffs to reflect variations in reliability (firmness) and transportation contract duration.

FERC Order 636
FERC Order 636, issued April 9, 1992, "restructured" (in FERC's words) the natural gas industry to stimulate competition by consumers for gas supplies and transportation. Order 636 required pipeline companies to open access to capacity to any and all transporters and to unbundle transportation services so as to allow customers to select supply and transportation services from any competitor in whatever quantity and combination they desired.

FERC Order 888
Adopted in 1996, this order required utilities to allow everyone access to utility-owned electric transmission lines to move power from generators to customers. Applied only to wholesale power markets because FERC has no authority over retail markets but it released pent-up demand and spurred inter-regional power trading, resulting in low-cost power flowing to high-cost areas and a nation-wide leveling of wholesale power prices. Current wholesale power prices average about 3 cents power kilowatt-hour. (Put this in glossary?)

Fixed Costs. See Sunk Costs.

Fixed Price
A price that remains the same for a set time period. Energy buyers can solicit bids for energy supplies based on a fixed price for a specific contract term. This contrasts with price quotes that are tied to an index that floats up and down, typically a fuel cost index.

Forward Market
Options and futures allow a consumer to establish the price they are willing to pay for a product at some future point in time. Options and futures trade in terms of months into the future. For example, I could buy an option to purchase a specific quantity of natural gas for $ 3/ MMBtu 1 or 2 or 3 or up to 18 months from now. The prices for natural gas in each of those months are called "forward" prices. The trend in those prices, in other words, the price in each successive month is called a "forward price curve." Forward markets and forward price curves are essentially a forecast of what commodity prices will be made by people trading in commodity markets. Forward price curves are not necessarily accurate predictors of future prices, because commodity traders include individuals who are not directly involved in production of the commodity in question. These other traders may react to events differently than the commodity producer does. As a result, they may err in there sense of where prices will be in the future. Nevertheless, a forward price curve provides an indication of where "the market" thinks prices

are going that price sensitive consumers of commoditiesshould monitor, just in case the market is right.

Franchise
An agreement that permits a company to conduct business within a township, village, city, or other local government unit. Typically utilities are granted exclusive franchises to serve in a specified area. Franchises are granted by both states and municipalities. Municipalities often charge a franchise fee as a way to generate revenues and to compensate for use of municipal rights-of-way. States may also grant utility franchises. As a result, franchises may overlap. *See also Service Area.*

Fuel Cell
A fuel cell is a device that generates electricity and hot water through a chemical reaction by combining hydrogen and oxygen. These devices, which are starting to be commercially marketed, are most often fueled by natural gas, methanol ("wood alcohol"), or hydrogen. The hot water produced as a by-product of the chemical reaction can be used in heating systems. Fuel cell efficiency in the electric-only mode is between 40% and 60%. When waste heat is captured and used the overall efficiency increases to 70% to 90%. Most fuel cells are modular, so the fuel cell can be serviced without shutting it down and requiring back-up power. As a result, fuel cells are being viewed as potential substitutes for grid-supplied power. Fuel cells are already being used in limited applications to improve power quality for sensitive loads, such as computer chip manufacturing.

Fuel Component or Fuel-Cost Adjustment
Generating fuel costs can be highly variable. This variability can make it difficult for a utility to set rates because if the utility pays more for fuel than it planned, it will make less money. To deal with this uncertainty, regulators integrated fuel-cost adjustments into rate designs. This allows utilities to pass through changes in fuel costs. Typically, the rate allows for slight adjustments in the kWh charge from month to month. Energy suppliers will still face uncertain fuel costs. As a result, it is expected that prices will still be quoted in reference to a fuel cost index or spot market price. For example, power will be quoted as a discount off the spot market price (which is unknown until the day power is consumed). This form of pricing (index-based pricing) guarantees consumer savings compared to spot prices without putting undue risks on to the supplier.

Fuel Cost Adjustment. See Fuel Component.

G

Gas Turbine
Gas turbines are based on jet airplane engine designs. Air is sucked into the gas turbine where it is compressed. This increases the density of the air (which increases combustion efficiency) and heats it. Gaseous fuel is introduced in a combustion chamber and the resulting exhaust is used to drive a turbine attached to a generator rotor. Electric generators based on this design are usually called simple-cycle combustion turbines, or simply combustion turbines (CTs). Steam

generators are often used in conjunction with gas turbines in what are called combined-cycle combustion turbines, or CCCTs. Natural gas is used to fuel most new plants and is partly responsible for the high heat rate of new plants. Coal is an abundant native fuel that can be converted into gas similar to natural gas for use in gas turbines. Plants that include coal gasification are called integrated gasified combined cycle plants (IGCCs). IGCC plants are cleaner burning than old-style coal plants. *See also Turbine Generator.*

Generating Reserves
Generating reserves is the excess capacity that regulators require utilities to have to meet emergencies during peak demand periods. The amount required, stated in percentage of peak demand, is called a reserve margin. Typical reserve margins are 15 to 20 percent. Reserves can be provided by having idle plants in the utility generation inventory or having unused plant capacity during peak periods (i.e., all plants are not running at full capacity). Having idle capacity is expensive. Another way to provide reserves is to rely on the idle capacity of adjacent utilities. This is much more economical, especially if the loads of adjacent utilities peak at different times.

Generation Charge (also known as Shopping Credit or Standard Offer)
Deregulation language varies from state to state. This phrase refers to the component of the power bill that is associated with the cost of producing electricity. When there is competition between electric companies, this charge depends on the terms of service between the customers and the supplier. In other words, under competition, it varies depending on the supplier the customer chooses. Some states refer to this generation charge as the “shopping credit” or “standard offer.” Unfortunately, the term “standard offer” is also used by many states to refer to the default service rate offered to customers who do not choose or cannot secure power supplies from an alternative suppler.

Generation Company (Genco)
This is a company that operates and maintains a power plant that generates electricity. The new term, Genco, is used to designate firms that are generation companies exclusively. Gencos may be utility subsidiaries, but they do not own wires or perform traditional utility service functions. The term Genco includes all of the various legal terms for power generators, including Qualifying Facilities, Independent Power Producers, and Exempt Wholesale Generators.

Gen-Set
Engine generators, or gen-sets, use an engine as a prime mover to turn the generator rotor. Typical gen-sets are fueled with diesel oil or natural gas. Gen-sets are also often used by consumers for emergency power.

Green Power
Electricity that is produced from sources that are thought to be environmentally cleaner than traditional sources. Green power is usually defined as power from renewable energy that comes from wind, solar, biomass energy, etc. There are various definitions of green resources. Some definitions include power produced from waste-to-energy and wood-fired plants that may produce air emissions as bad as conventional fuels. Some states have defined certain local resources as green that other states would not consider green. For example, the state of Texas has

defined power from efficient natural gas-fired power plants as green. Some northwest states include power from large hydropower projects as green although these projects damage fish populations.

Various states and the federal government are working to clarify labeling for green power. GSA and DESC both request bids for green products that fit the environmentally beneficial guidelines used by the government. Any agency can purchase green power from GSA or DESC and be confident of the source. Further clarification of green power purchasing will be forthcoming as a result of Executive Order 13123. FEMP, GSA, and DESC will provide Federal agencies with information as deregulation proceeds.

Grid or Power Grid or Bulk Power System
A network for the transmission of electricity throughout a state or region. The term grid usually refers to the transmission lines; however, the power system is designed as an integrated system that specifically relies on generation and transmission to move power from location to location. The transmission grid is designed as a network, meaning the connections allow two-way power flows. In contrast, local distribution systems are generally designed for power to flow one way, from the transmission lines to end users. The term "radial" is applied to these one-way transmission and distribution elements. One exception is for transmission lines that link generation to the bulk power network. Obviously power flows one way along these lines. They are called integrating transmission lines because they integrate generators into the grid.

The nation's transmission network is divided into three major systems (Western, Eastern, and Texas), which are electrically isolated from each other. Within each of these networks (called "interconnections"), transmission systems are operated at a regional or utility-area level by "control centers." There are roughly 140 control centers in North America. Each control center manages power flows within its own boundaries and coordinates flows across boundaries with adjacent control areas. If there is a major system failure, the network breaks down into component systems based on these control areas. As a result, the entire country (or interconnection) is saved from a black out. *See also Transmission System, Wholesale.*

H

Heat Rate
The efficiency of a plant is reflected in a metric called the heat rate, which is expressed in terms of Btus per kilowatt of power (e.g., 9,500 Btus/kWh). One kWh of power produces 3,412 Btus of energy, so a plant with a heat rate of 3,412 would be perfectly efficient. This is an ideal unlikely to be achieved, although improved heat rates are the focus of intense research sponsored by DOE and industry. The heat rate of best-of-class machines is approximately 6,500 Btus/kWh whereas the average heat rate for all generators in service today is about 11,500. Thus, new machines burn roughly half the fuel of the typical plant, with a similar reduction in carbon dioxide and other air emissions.

Heating Degree Days (HDD)
A measure of how cold a location is relative to a base (normal) temperature over a period of time. The heating degree days for a single day is the difference between the base temperature and the days average temperature. If the daily average is greater than or equal to the base, this would be a "zero" heating degree day. Sixty-five degrees is a common baseline, so one day with an average temperature of 66 degrees would be one HDD. Five days in a row at that temperature would be 5 HDD, and so on.

Hedge. See Price Ceiling.

Holding Companies
A holding company may own a number of utilities that provide retail service in multiple states, usually adjacent states. Each utility owned by a holding company is a separate corporate entity, with its own board of directors. A good example is the Southern Company, which owns Georgia Power, Mississippi Power, and others. About two dozen IOUs operate as holding companies. The retail utility subsidiaries are regulated by state PUCs; however, dealings with the parent holding company cannot be regulated by individual states because they are interstate transactions. Instead, they are regulated by the Interstate Commerce Commission. The wholesale transactions of holding companies are also regulated by the FERC. The Public Utility Holding Company Act of 1935 (PUCHA) was passed to restrict the activities of holding companies due to abuses by holding companies early in the history of the industry. As a result, holding companies cannot participate in certain other utility businesses (water and telephone, for example). Utilities that are not part of a holding company may engage in these activities with the consent of the state PUC. Holding companies view this as unfair and are moving to repeal PUCHA.

Hour-Ahead Market. See Power Exchange.

Hub
Commodities are produced and consumed all over the place. Setting prices based on where a commodity is produced and consumed adds transportation costs that mask the underlying market value of the commodity. Therefore commodity markets establish prices based on delivery and receipt at specific points. The points that electricity and natural gas trade are called hubs. There are many trading hubs, which allows traders (and markets) to set market value based on the unique features of commodity production at each hub. For example, electricity that trades at the California-Oregon Border (COB) hub, reflects the fact that the power coming into that market is dominated by hydropower. Similarly, natural gas trading at the Henry (La.) Hub is from on-shore natural gas wells. The difference in price between hubs provides buyers and sellers an indication of the potential value of transporting energy between two hubs. It also provides traders with a basis for exchanging energy between two areas on an equal basis. For example, if I purchase electricity in Oregon, but need it in Florida, I can simply trade the power I have in Oregon based on the COB price for power at a hub in Florida, at the price that prevails there. That way I don’t have to move power from Oregon to Florida. This is a good deal for me, because I can’t physically move the power that way. Even if I could, I would lose a fraction of the power to transmission losses.

Hydropower. See Electric Generation.

I

Implementation Costs
Implementing deregulation as directed by legislation or PUC orders often imposes costs on utilities that were not anticipated in current rates. As a result, many utilities have requested compensation for these costs in new, or anticipated future, rates. Examples of implementation costs include setting up power pools or independent system operators and educating customers to changes in power supply options.

Independent Power Producer (IPP)
An electricity generator that sells power to others but is not owned by a utility. IPPs were spawned by the Public Utility Regulatory Policies Act of 1978 (PURPA). Section 210 of PURPA required local utilities to purchase power from IPPs at the utility's avoided cost, which was often greater than what an IPP could produce power for. Such plants are called "qualifying facilities" or QFs. Today there are a variety of non-utility-owned generators. Various Federal laws govern these companies and their plants giving rise to a confusion of labels.

Index Pricing
Commodity markets are volatile. Sellers have the option to sell into the commodity market, at some unknown price in the future, or sell to a consumer for a specific price on a long term contract. If, however, the price in the contract is below that of the market, the seller will have given up profits. Similarly, if the contract price is higher than the market, the customer will lose money over simply purchasing from the market without a contract. One way to share this risk is to tie the price in the contract to a market price, or index. This is similar to an adjustable rate mortgage, where the borrower doesn't know the exact interest rate they will pay in the future, but they know it will track changes in interest rates. Index prices are normally offered at a discount to the market price. (Why would anyone agree to pay more?) As example would be an index price of "Henry Hub minus 3%." This translates into, "Your price will be whatever the price of natural gas is at the Henry Hub (a major gas trading market), less 3%." In other words, you will always save 3% over purchasing gas directly from the Henry Hub market. Thus, your gas price may go up and down with Henry Hub prices, but your price will always be lower than that price.

Independent System Operator (ISO)
ISOs are new institutions that operate regional transmission networks. Presently, ISOs do not own transmission assets. These continue to be owned by existing utilities. However, ISOs may evolve to replace the utilities as owners of transmission. ISOs are governed by boards of directors that represent the interests of all of a transmission system's users, not just transmission owners. The ISO's mission is to ensure access to transmission by all users to facilitate competition in power supply markets. ISO charters vary by region. Some are responsible for transmission planning, rate setting, transaction processing, and construction of new facilities. Generally, ISOs subsume the functions of and eventually will replace some of the current 140-odd control centers. Another name for an ISO is Independent Tariff Administrator (ITA). Typically, an ITA is not as fully engaged in transmission planning and operations as an ISO.

Transmission Companies, or Transcos, are a third variation on the ISO theme. No Transcos are presently in operation in the United States. Transcos are generally expected to be for-profit firms, in contrast to ISOs and ITAs. Transcos are also expected to own transmission assets. *See also Grid and Bulk Power Market.*

Independent Transmission Company
An independent company that owns and operates a transmission system for a group of utilities. Generally an independent transmission company also owns generation, in which case it is called a "generation and transmission" company or G&T. Typically, G&Ts are formed by cooperatives and other not-for-profit utilities that want to pool the costs and risks of power plant development. Deregulation of wholesale power markets is expected to encourage utilities to sell off transmission to new, independent transmission companies. These are referred to as Transcos.

Integrated Gasified Combined-Cycle Plants. See Gas Turbines.

Integrated Resource Planning (IRP)
A planning process in which utilities look at multiple sources to meet demand for power. In addition to traditional fossil fuel plants, utilities would give equal or greater weight to alternative supply options, renewable generation, and energy conservation. IRP was fashionable in the 1980s and early 1990s because it engaged all stakeholders in utility planning. However, it fell from favor when natural gas prices fell in the late-1980s, making new generating plants and new power supplies relatively inexpensive.

Intermediate Plants
In between peakers and base load plants is a class of plants called *intermediate* or *mid-merit plants*. These plants are run more often than peaking plants but not as often as base load plants. They are generally based on a combined-cycle combustion turbine design. Hence they use a higher cost fuel than a base-load plant but these higher fuel costs are offset by better heat rates. *See also Peaking Plants, Base-Load Plants.*

Interruptible Rate
A special utility rate discount given to those who agree to have their service reduced or curtailed as needed by the utility. Circumstances for service interruptions can be periods of high demand or high cost or periods of short supply for the utility, or system emergencies. Large companies or industrial customers often have this type of contract with utility companies. The benefits to participating customers are two-fold: first, significantly lower overall power costs and second, reduced reliance on power during high-cost periods. The benefit to the utility is reduced on-peak generating reserves. The reduced need for generating reserves reduces the utility's costs, which all customers benefit from in the form of slightly lower rates.

Intervene
To intervene is to participate in the regulatory process through which utility rates are set.

Inverted Rate
An inverted rate provides consumers with an incentive to decrease power consumption by increasing the cost per kWh as total use increases. Both declining block and inverted rates can have multiple blocks. The simplest form consists of two blocks. However, three or four blocks, each with a different kWh charge, are not unusual. This kind of rate design requires regulation; it would be impossible to implement in an open and competitive market. *See also Declining Block Rate.*

Investor-Owned Utility (IOU)
Any company owned by stockholders that provides utility services. IOUs are for-profit firms. They raise capital by issuing stock to investors, hence the term investor-owned. Roughly 250 of the 3,200 utilities operating in the United States are IOUs. These IOUs provide power to almost 70% of all consumers. Because they are for-profit firms with a responsibility to earn profits for stockholders, instead of keeping rates low for consumers, they are regulated by state commissions. Holding companies are IOUs with multiple utility subsidiaries in different states. Because holding company subsidiaries operate in multiple states they are regulated at the federal level by the Interstate Commerce Commission. *See also Holding Companies.*

K

Kilowatt (kW) of Demand
This is equal to 1,000 watts. It is used as a measure of demand for electricity independent of time. Ten 100-watt light bulbs use one kW (10 times 100) of electricity. *See also kilowatt-hour.*

Kilowatt-hour (kWh)
The basic unit of electric energy for which most customers are charged. It incorporates the kW demand and the duration of use in one metric. For example, ten 100-watt light bulbs left on for one hour use 1,000 (10 times 100) Watt-hours, or 1 kWh. If they burn for a total of 5 hours, they will use 5 kWh. If all 10 burn for 5 hours and only 5 burn for the next 5 hours, they will use a total of 7.5 kWh. This ability to integrate demand and duration demonstrates why kWh is favored as a way to measure and calculate electricity use. Consumers are charged for electricity in cents per kilowatt-hour.

Kilowatt-Hour Charge or Usage Charge
Energy costs are recovered through a usage or kilowatt-hour charge. The simple form of a kWh charge is a fee that is the same regardless of time or quantity of use. Many small utilities use this kind of rate design because it is easy to administer using simple kWh meters. However, most large utilities employ more sophisticated cost recover mechanisms or *rate designs*.

L

Load or Demand or kW Demand
The amount of electricity being used at a specific point in time by a customer, circuit, or system. Demand is measured in terms of kilowatts (kW), not in the more familiar kWh, which reflects demand over a period of time rather than in an instant of time. *See also Kilowatt and Demand.*

Load Aggregation
When multiple customers join together to solicit bids to supply power. Present deregulation regulations base competition for power supplies on individual meters, rather than customers. In one sense, a building or firm with multiple meters aggregates its own loads when it requests a power supply bid for its total energy needs. Federal agencies may join load aggregations that include other Federal agency loads or participate in aggregations of other non-Federal governments. For the most part, GSA and the U.S. Department of Defense aggregate Federal agency loads on behalf of other Federal agencies. It is assumed that aggregation will result in better bids on competitive solicitations. However, early experience has not shown that to be the case. Nevertheless, considerable costs are involved in competitive power procurements, so joining an aggregation may significantly reduce those costs.

Load Center
A large concentration of customers, like a metropolitan area, is called a load center. Power from remotely located generators travels to load centers along high-voltage transmission lines.

Load Factor
Customers with similar electricity usage can have significantly different electricity bills based on demand charges. If a greater proportion of electricity is used during peak demand periods, both demand charges and any TOU rate impacts will be greater than for customers with usage that is more constant over the course of the day. A common metric for evaluating this impact is the *load factor*. Load factor is the ratio of <u>peak</u> demand to <u>average</u> energy use. It is calculated as follows:

> Load factor for one month = [total **kWh** use for the month / number of hours in the month: ~720 hours] / maximum **kW** demand for billing interval, such as hour or 15 minutes.

Typical homes have a load factor of .45, businesses about .6, and industries between .85 and .95. A load factor of 1 results when electricity use is constant throughout the day, week, and month. In general, the higher the load factor, the lower the average cost of power per kilowatt-hour when all charges are factored in. In other words average kWh cost (the total bill divided by total use in kWh) is lower for customers with higher load factors. The lowest average kWh cost (and total electricity bill) is obtained when the load factor exceeds 1, as that indicates a shift in consumption to lower cost, off-peak periods.

Load Management.
Load management involves changing the way energy is used on a daily or seasonal basis, usually to reduce electricity bills. There are three basic load management strategies:

1) Peak clipping is the curtailment of on-peak power use. Peak clipping reduces both peak and total energy use, because the use is curtailed and not made up later.

2) Peak shifting is like peak clipping except that the activities that would have used energy on-peak are rescheduled to other periods. In other words, the same amount of energy is used, but some of that use is shifted from peak to off-peak times. Sometimes peak shifting results in an increase in total energy use, albeit at lower unit costs, so the total bill is reduced.

3) The third form of load management is valley filling. A valley is a period between two peaks, hence the name. Utilities have sometimes encouraged power use during off-peak periods by discounting the price. Valley filling does not necessarily require that energy use shift to a valley period. In fact, the utility's goal in offering off-peak power rates is to increase total energy use by encouraging off-peak use.

Load management is generally accomplished through control of specific energy-using operations. Historically, utilities have provided control signals to this equipment or advised customers when it is time to curtail use.

Competitive pricing of electricity will result in prices that vary on an hourly basis. These prices will act much like utility load control directions. However, all customers will be able to benefit by adapting energy use practices to respond to changing prices. Presently, power prices are very high during peak periods (typically hot summer days). Prices may also spike due to unseasonable weather and unplanned equipment outages. At the same time, prices tend to be very low, even zero, during low use periods, typically in the spring and fall and late at night or early in the morning. In some countries power producers actually give customers credit for using power during low-use periods (up to 2 cents/kWh). Credits, zero-priced power, and valley filling make both economic and environmental sense, because power plants are less efficient when they cycle on and off or operate at low levels of capacity. As a result, it can actually be less expensive (and less polluting) to give power away during some periods if that will enable the generator to maintain power production at an optimal level.

The future of load management lies not in following utility directions, but in adjusting energy use schedules to follow power price trends, curtailing use during very high cost periods, adopting energy storage, and joining district heating and cooling utilities to take advantage of very low power prices.

Load Management Cooperative
A group of customers or facility managers that forms a cooperative to evaluate their respective load curtailment capabilities during various times of day and seasons. The results are compiled and reduced to allow for non-coincidence of loads and other factors participants believe may make it difficult to shed loads beyond a certain point. This provides a cushion "just in case." The cooperative notifies the utility or capacity market of the potential load available for

curtailment. In regulated markets, the cooperative would negotiate a reimbursement rate or rate discount directly with the local utility. In a competitive market the participants would normally submit a curtailment bid, just like a generator, to the power exchange or ISO. In most competitive markets these bids would be submitted by a third-party authorized to coordinate resources with the power exchange or ISO. The demand bid may offer a range of curtailment options with various prices for each. If a demand bid is accepted, the participants will be notified of the expected quantity of load to curtail, curtailment hours, and duration, along with the price to be paid. Once the expected curtailment is known, the participants allocate the curtailment among themselves based on expected operations during the curtailment period. In that manner participants that are unable to curtail their operations for some reason may rely on another participant to take up the slack. Hence the need for the cushion noted previously. For example, assume 3 firms are each willing to curtail 5 MW of load in exchange for a utility payment. But, when the utility calls for the load curtailment, one of the firms doesn't want to curtail the full 5 MW. They can only manage 3 MW. The other two firms then curtail 6 MW each, so the utility gets the full 15 MW the 3 firms agreed to provide. Over time, the over-and-under curtailments may average out among the firms, or there may have to be a cost adjustment to make each firm whole.

Load Shedding Pool. See Load Management Cooperative.

Lumen
A lumen is a measure of the amount of visible light, such as is produced by a light bulb.

M

Marginal Cost
The change in total costs associated with a one-unit change in the quantity supplied. For an electric utility, this would be the cost of providing an additional kilowatt hour of electricity to a consumer. Marginal cost is an economic concept that assumes quantities of a commodity can be provided in single unit increments. Utility plants are generally large and long-lived. Adding an entire new plant to meet an extra kilowatt of demand is very expensive. Prior to deregulation the cost of this avoided plant was used to determine marginal (or avoided) cost. Presently, commodity markets (or power pools) play this role.

In commodity markets, power owners (many of whom are speculators) offer to sell power to power buyers (again, many of whom are speculators). The owners have secured rights to power capacity that they are willing to sell when the price is right. Prices get bid up by buyers, usually in response to anticipated power demand. If prices are too high, buyers can refuse to purchase and force speculators to sell off supplies at a loss (since power is best used as it is produced). Under regulation, captive customers had to absorb this price risk. Competitive commodity markets shift the risk to speculators. In other words, if a speculator purchases power that they cannot sell at a price they want, they have to discount the price and sell at a loss. In a corresponding fashion, customers absorb the risk of higher prices when supplies are tight. However, customers are also free to avoid using power when prices are high by not operating electricity-using equipment during high-cost periods.

Marginal Price. See Dutch Auction.

Market-Based Price
The price for a commodity or service as determined by the decisions of many buyers and sellers in a competitive market. In general, the phrase "market-based price" is used to refer to a commodity price as reflected in a spot market. However, there are many other markets, including bi-lateral contracts where sales prices are negotiated at prices that differ from spot prices. Similarly, spot prices are for a point in time. Buyers and sellers can protect themselves against unexpected price swings by purchasing a commodity future or option that locks in the price in advance. *See also Marginal Cost.*

Market Clearing Price. See Dutch Auction.

Market Manipulation
See Enron, just kidding. Markets are governed by a combination of rules and procedures and trust among buyers and sellers. Unfortunately, all parties are not always trustworthy and rules and procedures cannot anticipate all situations. Consequently, some traders can figure out ways around some of the rules, without other parties knowing it, and use this knowledge to take advantage of other parties in the market. A classic way to do this is for sellers to collude to set prices. This is patently illegal. Nevertheless, there are ways sellers can "signal," like Bridge player, to one another without specifically communicating. This is common in the airline industry where one airline will post new fares that are uniformly higher. All the other airlines can see this change when it is posted on the airline reservation system. If the other airlines match the increase, ticket prices will increase. This is still legal, because the airlines didn't meet to set the price. Likewise, competitive energy markets provide a mechanism for market participants to signal to one another. This only works well if there are a few large traders and they dominate the market. Unfortunately, that is the case in electricity markets and markets for transmission and gas pipeline capacity. There are other ways to manipulate prices that may well be illegal or, at least outlawed once discovered. Enron and others engaged in these during the California power crisis. One is to create an artificial shortage of energy by withholding energy from the market. If the market believes the shortage is real, it will drive prices up rapidly. Another is to combine energy imports and exports to the same market that cancel each other out over time. For example, Enron exported power out of California during the power crisis. It then imported the same amount of power into California. Because the California market "saw" the export, it thought there would be a power shortage and prices ran up. Of course the power import relieved the shortage, but it also earned Enron a much higher price. In reality, no power left the state. The trade was a shell game. Market monitors are supposed to catch these kinds of schemes. Unfortunately, as we learned from California, they are usually discovered only after the profits have been distributed and it is nearly impossible to get any money back. Moreover, by manipulating the price in the entire market, all traders and all trades are damaged and there is no way to make all parties whole again.

Market Marginal Price. See Dutch Auction.

Market Power
The ability of one utility to force a neighboring utility to buy its higher cost power rather than allowing the neighbor to purchase lower cost power from a third utility that would have to wheel the power across the first utility's transmission lines. *See also Divestiture.*

Market Price. See Dutch Auction.

Marketer
An agent who sells electricity or natural gas on behalf of a company that produces the gas or electricity. This term is used interchangeably with "supplier." A marketer has title to the power it sells and makes a profit on the mark-up between the purchase and the sales price. This is in contrast to a broker, who acts as an intermediary between a supplier and a buyer for a commission. Marketers are regulated at the state and Federal level and must apply to and be registered with FERC. Brokers may or may not be regulated at the state level and are not required to register with FERC.

MBtu (MBTU)
This stands for one million British Thermal Units (BTUs). MBTUs is a common unit of measure for natural gas and provides a convenient basis for comparison of the energy content of natural gas and electricity. One Megawatt hour of electricity (1,000 kWh) is equivalent to 3.413 MBTUs. Natural gas is measured in cubic feet. One cubic foot of gas is nominally equal to 1,000 BTUs. Thus, 1,000 cubic feet of gas (normally called one MCF or Mcf (M is the Roman numeral for 1,000; cf is an abbreviation for cubic feet) is equal to 1 MBTU. However, the heat (BTU) content of a unit of natural gas varies. Accordingly, natural gas is usually measured in "therms." One therm of gas is always equal to 100,000 BTU or .1 MBTU. Most major natural gas users purchase gas in quantities measured in tens of thousands of Decatherms. One Decatherms is equal to 1 MBTU.

Mega-NOPR
The Mega-NOPR is the Mega-Notice of Proposed Rulemaking that FERC issued in July 1991 requesting comments from consumers and industry about new ways of structuring gas transportation. This Mega-NOPR led to the end of gas price regulation with FERC Order 636, issued April 9, 1992, which required pipeline companies to open pipeline access to all transporters and to unbundle transportation services allowing customers to select supply and transportation services from any competitor in whatever quantity and combination they desired.

Merit Order
To dispatch power plants based on production costs, i.e., lowest production cost plants first. *See also Production Costs.*

Micro-Generation. See Microturbine Generators.

Microturbine Generators or Micro-Generation
Combustion turbines are used to power jet aircraft. A similar turbine is used in gas-fired power plants. A small turbine is used in vehicle engines to compress air and enrich the fuel-air mixture to improve combustion efficiency. Microturbine generators use a variation of vehicle turbines to produce electricity in a miniature power plant. This is a completely different turbine design from power-generating combustion turbines. Microturbine generators can run on liquid or gaseous fuels derived from natural gas, wood, or garbage. They are being marketed to households and businesses as an alternative to grid-supplied power. They are also being marketed as an alternative to batteries for back-up power. The installed cost of microturbines is expected to be competitive with grid-supplied power (including transmission and distribution costs).

Mid-Merit Plants. See Intermediate Plants.

Municipal Utility
A provider of utility services owned and operated by a city government is called a municipal utility. Municipal utilities are generally not subject to state regulation under the belief that consumers can control the actions of the utility through the electoral process. Municipal utilities currently are able to raise capital by issuing tax-exempt bonds which reduces their cost of operations. Because most states do not regulate municipal utilities, state deregulation legislation does not generally apply. However, if a municipal utility opts to deregulate itself, it is often covered by the same legislation as regulated investor-owned utility. Municipal utilities usually take one of two forms. They can be a part of the municipal government or a separate entity under the control of the municipal government, or they can operate as a municipal corporation granted by the State altogether separate from the local municipality.

N

National Association of Regulatory Utility Commissioners (NARUC)
This is an advisory council composed of utility regulatory agencies of the 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands. The primary objective of NARUC is to serve the consumer interest "by seeking to improve the quality and effectiveness of public regulation in America." NARUC holds periodic meetings of regulators, has standing committees, and advises state and federal bodies on utility legislation.

Natural Gas Act of 1938
Created the Federal Power Commission (FPC) and directed it to regulate natural gas pipelines, but not wellhead prices. Like all federal regulations, jurisdiction was limited to pipelines in **interstate** commerce. **Intrastate** pipelines were beyond the reach of FPC price regulation.

Natural Gas Policy Act of 1978 (creation of FERC out of the old Federal Power Commission)
This act created the Federal Energy Regulatory Commission (or FERC) out of the old Federal Power Commission. The act also accelerated domestic gas exploration in the 1980s by removing federal price caps that had been in place since the 1950s. This resulted in an increase in natural gas production and a decline in gas prices.

Net Metering
Generally, net metering means allowing customers to "sell" power back to the utility at the same rate at which it is purchased. Historically, this has been accomplished by letting customers "run the meter backwards" when they had surplus electricity from an on-site generating device. Net metering regulations were adopted to encourage customers to install solar and other renewable generating devices. Typically, net metering laws favor small residential and farm customers. In point of fact, the only kind of electric meter that can "run backwards" is a residential meter. Larger customers that do not have residential scale meters have to install a second meter to measure the output of on-site generating devices. The use of two meter readings to implement net metering is technically known as a "buy-sell" contract. The customer "buys" power through a regular utility billing meter and "sells" surplus power back to the utility using a separate meter. Two meters costs the utility more. As a result, the additional costs are passed on to the customer and may exceed the value of any surplus power sale. Further, once two meters are in place, the utility may use a different purchase price than the customer's rate.

Approximately two dozen states have net metering requirements; however, very few customers take advantage of them. (It is likely that many small customers simply run the meter backward without telling the utility. If the utility suspects a meter is running backwards, they may replace the meter. Most newer meters are designed to prevent reverse operation.) Although more states are adopting net metering rules, and Federal legislation has been introduced to mandate net metering, it is an anomaly in the face of utility deregulation. Specifically, it imposes regulatory requirements instead of reducing them and it may require utilities to purchase power from customers while deregulation rules prevent the utility from selling power to these same customers. Because true net metering (residential-scale meters that run backwards) has a limited application, increased customer participation is unlikely despite new rules. As a result, buy-sell arrangements will most likely be used in future rates. It is likely that buy-sell arrangements will peg the purchase price of customer-generated power to a spot market, which would not include the transmission and distribution component of rates, thus undermining the value of the surplus power the customer is trying to sell. Regardless, net metering, in the pure sense, is not applicable to most federal customer sites, because they do not have residential-scale meters that can run backwards. If customers are required to enter into buy-sell arrangements to implement net metering, the sale price needs to be reviewed.

Network. See Grid, Transmission System.

Nominating
Wholesale (and large) natural gas customers have to tell the gas pipeline company how much gas they are going to need and where it is coming from, so the pipeline company can make sure there is enough room in the pipeline to serve all of its customers. This is called nominating. Usually, customers nominate monthly, but some companies require more frequent estimates. Errors are made up by the pipeline company (or the gas supplier) in a process called balancing. If the errors average out over time, there usually isn't an extra charge. If there is a persistent imbalance, there will be an extra charge.

Non-Coincident Peak Demand (NCP)
Utility rates use maximum demand (measured in kW, not kWh) as a means to allocate fixed costs to large customers. If a customer has more than one meter at a site, the utility may add up the demand readings to find the maximum demand. Many meters only register the maximum demand reading and do not note when it occurred. If multiple demand readings are totaled to calculate total demand irrespective of when they occur, it is called non-coincident demand. If the demand readings are totaled for the same time interval, such as the system peak, it is called coincident demand. Because non-coincident demand uses several maximum readings, it is almost always greater than coincident demand, which uses the sum of demands at a single point in time, which may not be the maximum for all meters. In order to correlate demand across multiple meters, it is necessary to either have a totalizing meter (a conventional meter that continuously compiles multiple meter readings or a time-of-use or recording meter that can time-stamp meter readings. Customers with non-coincident or non-time-of-use demand meters may pay more than they would if they had coincident or time-of-use demand meters.

Non-Firm Purchase
Purchases of any commodity is on an "as available" basis. Spot market prices fluctuate as a function of demand and availability. One way to reduce price fluctuations is to offer to sell (or purchase) on a non-firm basis. With a non-firm purchase, there is no commitment on the part of the seller to continue to supply the commodity under certain circumstances, usually supply limitations. Non-firm electricity purchases are common in areas with resources that are dependant on variable generation, such as hydropower or renewables. They may be available in other areas where economic factors govern availability, such as when the power purchased is surplus to a utility's own needs or when power is offered during non-peak demand periods. Non-firm sales are also used in the natural gas and electricity transportation markets, where access to transportation assets is granted on a non-firm basis. For example, large gas users may secure pipeline transportation on a non-firm basis. When residential loads require the use of this capacity, the customer is not allowed to use the pipeline.

North American Reliability Council (NERC)
The New York blackout of 1965 was a wake up call to the power industry. The industry responded to the blackout by creating a voluntary, utility-managed reliability organization, the North American Electric Reliability Council (NERC). NERC divided the nation into ten reliability regions, with each region covering multiple states (except for the Texas-specific Electric Reliability Council of Texas, ERCOT). The largest council is the Western States Coordinating Council (WSCC), which covers the entire Western Interconnection, including 11 western states, two Canadian provinces, and the northern portion of Baja California in Mexico. The smallest is the Mid-Atlantic Coordinating Council (MAAC) covering New Jersey, the District of Columbia, and most of Pennsylvania and Maryland.

Nuclear Power
Nuclear energy is produced using steam driven turbines, just like fossil-fueled plants. However, the steam is produced from the heat of controlled nuclear reactions. Nuclear reactors produce radioactive waste but little or no air pollution.

O

Off-Peak/On-Peak
Blocks of time when energy demand is low (off-peak) or high (on-peak). Typically, on-peak power prices are higher both because production costs are greater and as a means to discourage on-peak power use and growth. Historically, on- and off-peak periods were defined by utilities and/or regulators. In competitive markets demand drives prices, but so does other factors. As a result, peak demand periods will not be the only times when market prices are high. As a result, on-peak periods will not be as predictable as they are with present utility time-of-use rate schedules.

On-System Sale or System Sale
A sale to customers where the delivery point is on (or directly interconnected with) a system (transportation, storage, and/or distribution) operated by the reporting company is called a system or on-system sale. Typically a system sale is a wholesale transaction based on an assumption by the seller that they have adequate capacity to satisfy the sale somewhere within their system (or options to make up any shortfall). The resources that make up the sale are not plant-specific, but from the "system" or entire portfolio of resources and power purchase agreements (and market purchases). System sales are fairly common in wholesale markets. Usually, system sales are desirable because they are linked to a known portfolio of resources rather than an individual plant (which may not operate all of the time) or unknown resources.

Open Access
A concept originally promoted in the natural gas industry, requiring transmission system (pipeline) owners to allow use of their transmission system by third party producers. The Federal Energy Regulatory Commission (FERC) first promulgated the reduction of barriers to pipeline access by third parties in Open Access Rules 436 and 500, and further defined open access terms and conditions in 1992 through FERC Order 636, the Restructuring Rule. Rule 636 had a revolutionary impact on the natural gas industry and wholesale gas market and established a precedent for FERC to follow in opening transmission access in the electricity market.

Operating Expenses
Operating expenses consist primarily of generating-plant fuel costs and labor. They contrast with fixed costs, such as debt repayments. Fuel costs are typically the largest operating expense and they vary depending on how much power is produced (i.e., the more power generated, the more fuel needed to fire the plant). Labor costs vary somewhat with power production, but are mostly constant (i.e., the same amount of people are needed to run the plant whether it is operating at full capacity or half capacity).

Operating Hour
Real-time, now, the hour during which power is being generated and consumed. System planners and operators prepare in advance to meet demand with generation, but those plans play out during the operating hour.

P

Peak Demand or Peak Load
Power demands on a system vary. The maximum demand (kW or MW) on the system over a specific interval (i.e., a year, month, day, etc.) is the system peak demand and the magnitude of the load is the peak load. The time it occurs (i.e., hour, 15-minute interval within an hour, etc.) is the peak demand period. *See also Off-Peak, On-Peak.*

Peak Load. See Peak Demand.

Peaker. See Peaking Plants.

Peaking Plants or Peakers
Plants that are used to meet peak loads. These generally run fewer than 400 hours a year. Utilities select plants that can be cycled easily, such as combustion turbines

Performance-Based Regulation (PBR)
Regulators use performance-based rate-setting mechanisms to link rewards (usually profits) to desired results or targets. PBR contrasts with rate-of-return regulation where the earnings on utility investment are assured regardless of utility performance. Under PBR, earnings vary based on performance against specified goals. PBR has been used to regulate telephone companies with mixed success. It is expected to become more widely used for regulating electric and gas utilities after deregulation when the focus of regulation is narrowed down to local distribution activities.

Phillips Decision
The 1954 Supreme Court decision that gave the Federal Power Commission control over producer prices and transportation for natural gas. In 1954, the Supreme Court determined that regulation of consumer prices required control over both producer prices and transportation in the landmark Phillips decision. Although price volatility was reduced by the Phillips decision, regulated price caps on production and pipelines eventually resulted in a two-tiered market; a price regulated interstate market and a largely market-based intrastate one. The supply

constraints of the 1970s were the result. Producer states had ample gas supplies and transportation whereas user states had neither. The solution came in the form of the Natural Gas Policy Act of 1978.

Photovoltaic (PV) Cells
PV cells are used in solar power panels. They convert sunlight to electrical energy. Electricity is produced in a series of small cells tied into an array. Solar arrays produce direct current (DC) electricity. In most off-grid applications the DC power is stored in batteries and used by DC-powered equipment, typically at 12 volts. In on-grid applications, the DC power is converted into conventional AC power and line voltage, 120 volts. Some power is lost in both battery storage and AC conversion. PV is only one of several ways solar energy can be used to meet conventional energy needs.

Pilot Program
Utilities test new ideas, products, and services by offering them to a limited number of customers. These experiments are called pilot programs or "pilots."

Power Grid
This is a system of interconnected transmission lines and generators that is managed so that generation is increased or decreased as necessary to meet the requirements of the power consumers who are connected to the grid. *See also Bulk Power Market and Grid.*

Power Marketing Administrations (PMAs)
The federal government owns four power marketing agencies: the Western Area Power Administration, the Bonneville Power Administration, the Southeastern Power Administration, and the Southwestern Power Administration, all within the U.S. Department of Energy (DOE). In addition, it oversees the semi-autonomous Tennessee Valley Authority, which is a federal corporation. Federal power agencies usually restrict their sales to wholesale customers, typically publicly owned utilities. However, they have the authority to sell to federal and state agencies. Some states also have power marketing agencies. Examples include the New York Power Authority and the Lower Colorado River Authority in Texas.

Power Pool
Traditionally, a power pool is a voluntary association formed by utilities to share responsibility for the reliability and integrity of a regional power grid by enabling pool members to share or pool power resources and reserves. Power pools may also engage in coordinated power plant operations to operate less expensive plants before more expensive plants and to share savings among members. Power pools that automatically schedule plant operations to minimize pool costs are called tight pools. Transactions in loose pools are bilateral and discretionary. (The pool cannot change which plants run based on cost.) Historically, power pools were exclusively utility institutions, with primarily IOUs as members. Although pools reduced wholesale power costs, savings were not optimized or shared as broadly as possible and savings were not always passed on to retail customers. Deregulation of the wholesale market caused all power pools to change their membership and operations. Now, pools are open to representatives of all stakeholder groups and plants are dispatched based on bids rather than operating costs.

Power Sources or Source Energy
Power sources are the types of fuels used to produce electricity such as nuclear, fossil fuels (natural gas, oil, and coal), and renewable energy resources (hydro, wind, biomass, and solar). The power source is becoming more critical in commodity purchases because some fuels pollute more than others, particularly coal.

Price Cap
When the price for a commodity has been determined or fixed or limited to some pre-specified maximum it is “capped” or subject to a “price cap.” This price may not change even under high market demand. Price caps are adopted to limit the run up in prices in competitive markets when high, or volatile, prices might hurt too many consumers and undermine confidence in the market. Price controls of any sort are usually a last resort for competitive markets. Price caps have been implemented under both deregulation and merger agreements. Price caps force utilities to absorb the costs of unexpected increases in fuel prices or lower-than-expected retail power sales. Price caps are part of deregulation agreements in California, New England (although the cap increases over time), and most other states. The caps were adopted in these states to ensure that consumer rates would remain fixed over time. Unexpected price increases would have to be absorbed by the local utility instead of consumers. Price caps have also been adopted in some competitive markets, where price volatility has been unusually great. Often this is a signal that something is wrong in the market, usually not enough competitors or price-fixing among competitors. Price caps have been imposed in the wholesale capacity markets in California, the Midwest, and New England because of price volatility.

Price Ceiling
A price cap offered by a marketer to encourage customers to purchase energy on a long-term contract. Because market based prices don’t protect the consumer from extremely high prices, some contracts offer the protection of a “not to exceed” level. In exchange for offering a price ceiling the marketer may charge a slight premium when prices are low or may set a price floor, the minimum the customer must pay even if market-based prices drop below it. When combined, this price ceiling and price floor are called a price collar, which protects consumers from high prices and marketers from low prices. Price caps, floors, and collars are called hedges because they provide the buyer or the seller a hedge or protection against unfavorable market prices.

Price Floor. See Price Ceiling.

Price Indexes
Commodity prices change throughout every market day, just as stock prices change. Typically, electricity price changes are tied to the hour of use. For example, electricity supplied for loads at noon is priced separately from that for loads at 1 o’clock. Because power prices are expected to change in the future, power sellers are unwilling to absorb these unknown price changes without charging a premium to cover their anticipated risk. One way to eliminate that risk is to quote retail price bids in relation to actual prices, also called indexes. This is already the case in the natural gas market, where commodity prices are quotes in comparison to commodity market indexes. For example, prices may be quoted as “Henry Hub minus 3%.” The Henry Hub is a trading point used for commodity trades of natural gas. “Minus 3%” means that the price bid

will be 3% lower than whatever the Henry Hub price happens to be on the day the gas is used. This kind of pricing shifts the risk of price volatility to the consumer, but the discounts provide known savings. As a result, the consumer knows they will save money over going into the commodity market to purchase gas on a daily basis.

The alternative to index pricing is some form of fixed pricing. However, a fixed price bid requires some knowledge of what future prices are likely to be, often including commodity prices other than that being sold. For example, spot electricity prices vary as a function of both power demand and natural gas prices. In order to offer a fixed price for power for next year, a seller needs to know what both power and gas prices are likely to do. In most cases, a seller offers a fixed price based on both what they think prices will do and a fudge factor that protects them against unexpectedly high prices.

Pricing Options
Among the different competitive power suppliers there are several types of pricing options being offered. Some may charge the same price for every kilowatt-hour of electricity that you use; whereas others will charge different rates depending on the time of consumption or the amount consumed. Prices may be determined in accordance with whether you purchase other services along with electricity such as energy-efficiency assistance. As electricity markets become more competitive (through the elimination of stranded cost surcharges) prices will tend to be tied to indexes that change hourly. *See also Price Indexes.*

Prime Mover. See Electric Generation.

Private Utilities. See Investor-Owned Utilities.

Production Costs or Variable Costs
A utility's dominant production costs are its fuel costs. These controllable costs are referred to as variable costs. Plants are generally dispatched (started and run) to serve loads based on production costs in what is called merit order, i.e., lowest production costs first. That way the most efficient plants run the most, often minimizing production costs. Since fixed costs are sunk, this has the effect of minimizing total costs.

Public Benefits Fund
Regulated utility rates often include charges that are for activities not directly related to providing utility service. Many states and consumer-owned utilities have implemented programs to encourage energy efficiency, to assist low-income customers with their bills, and to weatherize homes of low-income customers. These programs are paid for through a small surcharge in the bill, called a Public Benefits Fee, typically less than 5%. Many customer-owned utilities, especially municipal utilities, levy a charge on consumer bills to generate general fund revenues to operate the municipality. These funds are jeopardized under deregulation. As a result, deregulation agreements often include a continuation of these fees, usually at a rate of 3% or less. The fees are targeted at supporting what are called public benefit programs. Prior to deregulation, fees collected for public benefits were usually spent by the local utility. Many post-deregulation agreements place these funds into a trust that is spent according to the directives of a non-utility-affiliated third party or advisory board.

Public Purpose Fee. See Public Benefits Fund.

Public Service Commission. See Public Utility Commission.

Public Utility Commission (PUC) or Public Service Commission or Commerce Commission
State regulators have jurisdiction over the rates and sometimes the operations of utilities serving in the state. These regulatory agencies have various names, with PUC being the most common. PUCs may also have jurisdiction over customer-owned utilities, although that is not common. Commissions approve retail rates and utility plans, and also ensure that utilities are responding to customer service requests and are properly maintaining distribution systems. State regulators do not have jurisdiction over corporations with interstate utility operations organized as holding companies. Holding companies are overseen at the federal level by the Interstate Commerce Commission (ICC). The general public can get involved in any proceeding before a PUC or the ICC. Many states actually require utilities to reimburse customer groups that intervene in utility proceedings before the PUC.

Public Utility Holding Act of 1935 (PUHCA)
Since state regulation was not sufficient to control the action of interstate holding companies headquartered out-of-state, Congress passed the Public Utility Holding Company Act of 1935 (PUHCA). The PUHCA restricted the influence of holding companies, provided for regulation of holding companies at the federal level, limited the number and kind of utilities a holding company can own, and gave state regulatory commissions more control over affiliate utilities' rates and services.

Publicly Owned Utility
Publicly owned utilities are member-owned cooperatives or government or municipally owned utilities. Publicly owned utilities are generally exempt from regulation by state regulatory commissions because they are assumed to have the customers' (who are also the owners or voters) best interests in mind when setting rates and service standards. A few states do subject publicly owned utilities to regulatory oversight.

Public Utility Regulatory Policies Act of 1978 (PURPA)
In order to encourage the development of these unique and often small-scale resources and thereby to diversify the domestic power resource base, Congress passed legislation that both allowed non-utilities to build power plants and required local utilities to purchase the output on terms favorable to the developers. Many states passed legislation that went further and mandated the purchase at specific prices. The federal legislation is found in Section 210 of the Public Utility Regulatory Policies Act of 1978 (*PURPA*). This legislation created a new legal category of power plants known as qualifying facilities, or QFs, and new market entrants called independent power producers, or IPPs. *See also Independent Power Producers.*

PX or Power Exchange
A commodity market is often called an exchange. A power pool is a power exchange. California created the California Power Exchange (CalPX) as a new institution to replace the former loose power pool operating in the state. The CalPX operates a wholesale energy (kWh) market open to virtually anyone who wants to trade power. The PX conducts three primary auctions: day-ahead, hour-ahead, and real-time. The day-ahead market trades power in one-hour blocks for each of the 24 hours of the next day. The hour-ahead market allows the PX to fine tune the generation schedule in light of real-time loads and climate. Power exchanges are not exclusive. Other firms also operate power exchanges in California as well as other states.

Qualifying Facility. See Independent Power Producer.

R

Rate, or Tariff
The rate is the price set by the local utility for the power it sells. *See also Rate Making.*

Rate Base
The rate base is the value of a utility's assets, established by state regulations, upon which the utility is allowed to earn a specified return. Utilities raise capital from investors and invest in utility assets that benefit their customers, such as power plants, distribution systems, and other facilities. In order to attract investors, the utility must pay them an incentive like interest that is paid on borrowed money. This incentive is called the rate-of-return and is set by the PUC to be competitive with private-sector investments with similar risk. Regulators only allow the rate-of-return to be earned on specific investments. These are called the rate base. The rate base changes constantly as utilities make new investments. The rate of return can be changed by the PUC when it feels an adjustment is justified. Similarly, the PUC can add or remove investments in the rate base. Historically, regulators have followed utility recommendations on what investments should be included in the rate base and on an acceptable rate of return. Commissions have gotten more critical recently and have been more willing to remove items from the rate base and reduce the rate of return.

Rate Case
Utility rates are established (set) through an often complex and lengthy process called a *rate case*. Because rates are regulated based on cost-of-service, rate cases primarily focus on a detailed examination of historic and/or projected utility costs. As a result, the utility has to open up its financial records for review by regulators and the general public, including competitors, such as vendors of other fuels and adjacent utilities. Rate cases are concerned with two primary issues, the rate level, or amount of money the utility can collect, and rate design, or how they structure the rate to collect necessary revenues. Utilities cannot change rate designs or levels outside of a rate case, although they may request minor changes in rates and therefore request a limited case. The schedule for rate cases is controlled by each utility in most states. In other words, a utility only initiates a rate case when it needs to adjust revenues up (or down) or requires a higher rate of return to attract investment capital.

A few states require utilities to submit to rate cases on a periodic basis and others can order rate reviews independent of the utility. In most states interveners (parties not associated with either the utility or regulator) may request a rate review, although the decision to proceed is up to the regulator. In general, utilities and regulators try to limit the frequency of rate cases. As a result, utilities typically initiate rate cases only when they anticipate lower than expected revenues or rates-of-return, or when they have a significant change in capital investment, such as the addition of a new generating plant. Because fuel costs are a significant component of utility rates, volatile fuel costs can require frequent rate cases. Many states have adopted fuel cost adjustment clauses that allow utilities to adjust rates periodically without a rate hearing.

Rate Design. See Rate Making.

Rate Level. See Rate Making.

Rate Making
Utilities need to recover sufficient revenues to pay all of the expenses incurred, including debt service, returns to investors, and operations and maintenance. The total of these requirements sets the rate level. The process of ratemaking involves translating the rate level into specific rates for each customer, a process called rate design. The rate making ideal is for the cost of service to be perfectly allocated to each customer; that philosophy is one of "cost follows cause." However, customizing rates for each individual customer is far too expensive and cumbersome. Instead, rate design approximates customer-specific costs by grouping customers into similar customer classes. Rates are then designed to recover costs from a representative customer for each class. Typical rate classes include residential, small commercial, large commercial, industrial, and street lighting

Rate of Return
Regulators allow utilities to earn a rate of return on invested capital raised from investors, a sum that is called the rate base. Regulators set the rate of return in a range that allows a utility to earn a profit on its investment and attract capital at favorable rates (compared to bank borrowing). However, this rate is generally set at a level low enough to protect customers' interests. Payment of the rate of return allows a utility (and its investors) to recover its investment through rates. Thus, the rate of return allows a utility to recover a return on its investments and a return of its investments, just like payments of interest and principal (respectively) on a bank loan. *See also Rate Base.*

Real-Time Market. See Power Exchange.

Real-Time Pricing or Time-of-Use Pricing (or Rates)
Power production costs (and value) vary throughout the day and season. Ideally, customers would pay these so-called marginal costs directly rather than paying an average price that masks the variation in costs. Some utilities offer rates that capture these effects either in true real-time prices or somewhat simpler time-of-use rates that track use and costs in multiple hour blocks. In competitive markets, the power provider monitors electricity use for each hour and bills customers on real-time contracts at the prevailing electricity spot market price. Real-time pricing

is expected to be the norm for most commercial customers after the transition to fully competitive markets. *See also Real-Time Metering, Time-of-Use Rates.*

Real-Time Metering or Time-of-Use Metering
In order to sell power on a time-differentiated basis (See Real-Time Pricing), meters that automatically read power use every 1 to 5 minutes are needed. Meters that record power use using a time-stamp are called time-of-use meters. Typically, use information is stored in time "buckets" every 5 to 60 minutes. The data is collected from the buckets periodically, and sometimes automatically. Another type of meter monitors and records power use continuously. Instead of storing this information, the meter is linked by a phone line or other communication system to a central computer that downloads the meter readings several times each hour. The readings are processed by a computer program to provide price and cost data consistent with the customer's contract or the operable tariff. Real-time meters are more expensive to purchase and operate than simple energy and demand meters. However, remote meter reading is required to operate real-time meters. Remote metering reading enables a variety of suppliers to provide power to a retail customer as they no longer have a need to maintain a staff of meter readers at sites where they have customers.

Regional Transmission Groups (RTGs)
Groups formed from mergers of utility transmission operations in response to FERC Order 888, which was issued in 1996 and allowed open access to electric utility transmission systems. There was a wave of RTG formations immediately after Order 888, mostly in the western United States although ISOs soon became the preferred transmission organization. *See also Regional Transmission Organization, Independent System Operator.*

Regional Transmission Organization (RTO)
FERC Order 888, issued in 1996, brought industry attention to transmission, a technically complex and previously somewhat ignored part of the business. A series of both regulatory and institutional forums have been held to explore various futures for the transmission business. It was obvious to many transmission-owning utilities that Order 888 made transmission a business subject to scale economies; i.e., bigger would be better. The only way to make transmission systems bigger was to merge operations with other utilities under what FERC initially called Regional Transmission Groups (RTGs). The ISO superceded these in popularity and was adopted in California, Texas, and the Northeastern states, from Pennsylvania and Maryland, north to Maine. In general, ISOs have more centralization of functions than RTGs. They have more robust planning functions, are better integrated with energy markets, exercise operational control over the power grid, and have more streamlined transmission tariffs. Despite these attributes, they still lack a clear business purpose and the authority and standing to grapple with issues like transmission expansion. In addition, many of the newly formed ISOs hew to traditional utility market territories. Many market participants, as well as FERC, believe that ISOs should encompass all utilities in a broad, regional organization with clear responsibility for system reliability, including expansion. FERC and the industry have called these new institutions Regional Transmission Organizations to distinguish them from existing ISOs. FERC doesn't believe it has authority to order utilities to join or form ISOs or RTOs except in unique situations, such as when it can require it as a condition for approval of utility mergers. It has advised Congress of the need for such authority, but Congress has yet to grant it. Nevertheless,

after witnessing the evolution of transmission since Order 888, FERC has directed all utilities to consider joining or forming an RTO and to report back to FERC by October 2000 on their decisions and plans. *See also Independent System Operator.*

Regulation
Broadly stated, a regulation is a rule or law established by the federal or state government that a company must follow. In utility terms, regulation is the act of overseeing utility operations and finances. Utility regulation is a substitute for the discipline of competition in competitive markets. Markets regulate certain business practices so they conform to the will of the market, assumed to be composed of many consumers. Markets are assumed to stimulate the offering of new products and services at optimal prices and to discipline firms that do not do so by driving them out of business. Utilities are assumed to offer services that are needs (rather than wants) that should be made available to the entire population at reasonable prices. The reasoning behind utility regulation is that the vagaries of the marketplace are thought to be too volatile to ensure a socially acceptable result, thus firms were selected to provide these services without competition. To prevent expected monopoly abuses, prices and operations are subject to regulation by a public body representing consumer interests.

Regulatory Assets
Regulatory assets are investments the utility made with an understanding from regulators that the associated costs could be recovered, even though there may be no tangible asset. The most well known example is investments in demand side management measures.

Reliability
Reliability is a catch word for providing dependable generation, transmission and distribution service. Consumers (and some regulators) confuse reliability with adequacy. Reliability involves maintenance of facilities and reserves and proper operation of facilities to maintain system operations within specified parameters (i.e., voltage, harmonics, etc.). Adequacy is related to reliability in that sufficient resources must also be provided to meet demand. If inadequate (in quantity or quality) resources are available, it is essentially impossible to operate the power system consistent with applicable standards. However, the provision of adequate resources is often a generation issue, whereas reliability is primarily a transmission operation issue. If adequate generation is not available to meet consumer demand, it won’t matter that the transmission infrastructure is 100% reliable. Because generation and transmission are substitutes in some cases, a similar claim can be made for transmission assets. Namely, if the transmission system isn’t expanded to keep step with demand, the fact that the existing system is 100% reliable is also beside the point. With deregulation, responsibility for adequacy and reliability are separate challenges for different participants. The power market is expected to provide adequate supplies to meet demand. Similarly, as users of the transmission grid, power suppliers are expected to pay for the construction of new transmission facilities to ensure adequate transmission capacity to get power from new resources to growing loads. Transmission owners and operators (e.g., ISOs) are expected to plan for and manage transmission demand and facilities to ensure reliable transmission of power as needed to keep pace with demand growth. This implicit division of responsibility may obscure an accountability gap. Although either new transmission elements or local generation investments can solve pending reliability concerns,

there is, at present, no obvious mechanism under deregulation to dictate a solution if market processes fail.

Renewable Portfolio Standard (RPS)
An RPS is an environmental requirement some states have adopted that specifies that a minimum fraction of generation must come from renewable resources, typically wind and solar power. Some state deregulation agreements require all power marketers to maintain this fraction; others allow marketers to trade with renewable power developers to meet the standard. For example, the state may require that all power suppliers meet an RPS of 3% by 2005. As a result, every power supplier must be able to document resources in its resource portfolio that are derived from renewable power equal to 3% of state retail power sales in 2005. These can be in the form of renewable resources owned, or output purchased from such sources. Generally, states that have an RPS requirement also plan to verify the renewable claims of power suppliers.

Renewable Power
Renewable power, often called green power, is electricity that is produced with environmentally clean power sources such as solar, wind, hydro and biomass. There are multiple definitions of renewable power although most do not include large hydropower resources and power from waste-burning facilities. Although green power is often used to mean renewable generation, this is often not the case. As a result, it is necessary to clearly specify the kind of resources included in either definition and to establish how environmental claims are verified.

Reserve Margin. See Generating Reserve.

Restructuring
Restructuring is the process of changing the structure of a utility industry from one of monopoly supplier and captive customer to one of competition among suppliers for customers. Deregulation of price and customer choice restrictions is a governmental action that allows competition. Restructuring occurs when organizations respond to the advent of competition. As such, it is self-induced. In a phrase, it is what the industry does to itself, rather than what regulators do to the industry. Typical restructuring responses include separating utilities into their separate functions -- transmission, distribution, and generation; adding new products and services; merging with other firms; and divesting assets that are not considered to be central to the firm's new business direction. *See also Deregulation.*

Retail Customer
A customer who uses the energy it purchases rather then reselling it. Sometimes the term is used to refer to residential customers.

Retail Competition
The process through which companies attempt to sell products and services to the consumers. In deregulated energy markets, competing firms will be trying to sell energy directly to customers. Absent deregulation, the local utility is required to sell energy directly to its customers but is prohibited from selling energy to retail customers outside its boundaries.

Retail Wheeling
Retail power sellers need to arrange delivery of power to retail customers using the existing transmission and distribution system. The process of transmitting electricity over transmission lines not owned by the supplier to a retail customer of the supplier is called retail wheeling. Similar transfers at the wholesale level using the bulk power grid are simply called "wheeling." With retail wheeling, electricity consumers can secure their own supply of electricity indirectly, from a marketer or directly from the generating source. The power is then wheeled, or transmitted, for a rate that is a fixed rate or set by a utility commission. *See also Transmission Charges.*

Retailer
An energy retailer is a company authorized to resell energy to retail customers. Energy retailers are technically known as marketers but are also called suppliers. Marketers are required to be registered by state or federal agencies. Energy brokers may be lumped under this term, but they do not technically resell energy. Instead they act as facilitators of sales between owners and purchasers for which they receive a commission, like a realtor selling a house. They are not necessarily required to register with any state agency.

Rotor. See Electric Generation.

Run-of-River Hydro Plants
All dams create lakes behind them, however, some do not have a great amount of storage capacity because of the shape of the river valley and where the dams are located. One reason for this is other users of the river may not want to stop the flow of water. Dams used this way for hydropower production are called run-of-river dams. A notable example is the dams on the lower reaches of the Columbia River.

S

Schedule Coordinators (SCs)
Arrangements for transmission of power are both critically important and complicated. Accordingly, the right to schedule transmission transactions is restricted to properly trained and appropriately situated individuals or organizations. The term "schedule coordinator" comes from California. Other states and power systems have different names for this same activity, usually simply "scheduler" or "dispatcher."

Securitization
The process of paying the local utility for stranded costs (and sometimes temporary rate discounts) through bond sales. The bonds issued through securitization are paid off over a multi-year period. As a result, repayment of these bonds reduces the savings customers could receive under deregulation.

Service Area,
The service area, also known as the franchise territory, is a specifically defined territory in which a utility has been granted exclusive rights to sell energy y to retail customers. *See also Franchise.*

Shopping Credit. See Generation Charge.

Simple-Cycle Combustion Turbines. See Gas Turbines.

Slamming
Slamming is the act of changing a consumer's utility service provider without his/her knowledge or permission. This is typically achieved through some type of deceptive advertising. Slamming is common in the telephone industry. As a result of consumer complaints, the Federal Communications Commission (FCC) has fined telephone carriers with a proven history of slamming. Energy deregulation legislation often contains prohibitions against slamming in retail energy markets.

Solar Power
Solar power may use a variety of methods to produce electricity. Normally, it uses photovoltaic cells. However, power can also be produced using mirrors to concentrate sunlight to generate steam to turn turbines that produce electricity. Sometimes the solar energy is stored as heat so that power can be produced when the sun is not shining.

Source Energy. See Power Sources.

Spot Market
Short-term purchases of electricity or natural gas at current commodity market prices are called spot market purchases and the market is called a spot market. Commodity markets work on a bid and offer basis with many buyers and sellers meeting to negotiate prices in an auction type environment. Prices for commodities vary throughout the trading day, and from trading session to trading session. Prices can be fixed in other markets offering commodity deliveries at future dates. These are called futures or option contracts. Commodity markets are dominated by speculators who do not have a direct interest in the commodity they trade (they are not buying for their own use). As a result, commodity consumers have ready access to sources of supply and producers find a ready market for sales. Commodity markets are a key feature of well-developed competitive markets and are a hallmark of modern capitalism.

Spread. See Commodity Market.

Standard Offer Service
The standard offer is the price of the power that is supplied to you by your distribution company until you choose a competitive power supplier. Standard offer service is a transitional service that gives you time to learn about your options. The price of the standard offer service is set in advance, but may increase. In the early years of deregulation, standard offer service may be competitive with other competitive offers but in the longer run it is not expected to be the lowest

cost option. The standard offer rate is the price the local utility offers to customers that do not choose a new supplier.

Although the term "standard offer" is normally used to refer to a specific rate, a few states (mostly in New England) use the term to mean the imputed value of a pre-deregulation utility's cost of generation that is subject to competition after deregulation. For example, if the pre-deregulation utility rate is 10 cents and 3 cents of that reflects the cost of generation, the "standard offer" for competitive power supplies would be 3 cents. Customers would all pay the same the post-deregulation delivery rate of 7 cents (10 cents minus 3 cents) plus the price of power, either the 3 cent "standard offer" price, or less from a competitive supplier. Obviously, competitive offers that are less than the standard offer would result in consumer savings. This New England usage contrasts with the more common usage where the "standard offer rate" would be similar to the old, pre-deregulation utility rate of 10 cents. Competitive power suppliers may provide power at prices that result in total costs below the ten cent "standard offer" rate in our example.

Standby Service
Traditionally, standby service has applied to customers that rely on power from on-site generation. In most cases, the utility charges for "standing by" to provide power in case it is needed as a form of insurance. Often this charge is so high that it is uneconomical for a facility to install new on-site generation. After deregulation, customers with on-site generation should be able to purchase back-up power from the spot market at prevailing prices. This should be significantly less than most utility stand-by rates.

Stranded Costs
Stranded costs consist of assets such as generation, power contracts, and regulatory commitments that are currently paid for by customers which may not be recoverable by the utility if customers switch to other suppliers. For example, a utility may have generating costs that are 3 cents higher because of their mortgage on new power plants. If customers of the utility find another supplier whose power is 2 cents cheaper, they may switch. If the existing utility is forced to discount its power by 2 cents to stay competitive, the 2 cents per kilowatt it loses would be a stranded cost.

Existing power plants were built by utilities to meet service requirements imposed by regulators. As a result the utilities argue they should be allowed to recover these stranded costs (the 2-cent difference in the example) from current customers. All of the deregulation agreements made thus far are allowing utilities to recover some or all of these costs through a surcharge on sales and sometimes through a bond sale, called securitization. Having established a precedent with generating costs, other parties have succeeded in attaching additional stranded cost surcharges for labor contracts, conservation programs, and other vestiges of regulation that are imperiled by deregulation. Fortunately, stranded costs end after a transition period to full competition. When stranded cost recovery ends, consumer prices are expected to fall, often by 15 to 20%. *See also Securitization.*

Stranded Investments. See Stranded Costs.

Sunk Costs or Fixed Costs
A utility's fixed costs are predominately the costs associated with plant construction. These costs are similar to a home mortgage, which must be paid regardless of use. Although utilities are allowed to recover these costs, the costs themselves are sunk costs as nothing can be done to change them.

Supplier
A supplier is a new provider of electricity as an alternative to the incumbent utility. It may be a marketer, aggregator (purchasing from a marketer), or third-party power producer. Many deregulation agreements prevent incumbent utilities from selling power directly to their former customers. As a result, those utilities that want to remain in the power sales business have to form subsidiaries.

Supplier of Last Resort
The supplier automatically provided for a customer if the customer does not choose a new supplier under deregulation. This is usually the incumbent utility. Some states require the local utility to solicit power supplies from the competitive market rather than sell its own power to customers who choose not to change suppliers. Typically, the supplier of last resort sells power at a regulated rate, called a standard offer rate. *See also Standard Offer.*

System Sale. See On-System Sale.

T

Tariff. See Rate.

Tariff Administrator. See Independent System Operator.

Therm
A unit of measuring heat that stands for 100,000 British Thermal Units (BTUs). *See also BTU.*

Time-of-Use Meter
A meter that measures how much electricity a customer uses during a specific time of the day and in total. It is more sophisticated than typical kWh meters; however, it is not as sophisticated, or expensive, as a real-time meter that records electricity use continuously and communicates these readings back to a billing computer. *See also Real-Time Metering.*

Time-of-Use Rates
Rates charged to customers based on when they use electricity during the day and how much electricity they use. The costs (and value) of generation vary on a daily and seasonal basis. Utility rates tend to average these costs, which provides customers with misleading impressions of how much power costs, especially during peak use periods. Time-of-use rates are a response to the desire by utilities and economists to correct this situation by setting rates to more accurately mirror generating costs on a daily and seasonal basis. Time-of-use rates generally divide weekdays and months into high-cost on-peak periods and low-cost off-peak periods. The

intervals in between the peak and off-peak periods are often incorporated into a third rate that is called a shoulder or mid-peak period. Use during each of these periods is captured using a special meter that records the use in each period. *See also Real Time Pricing.*

Transition Charge
The mechanism by which stranded costs continue to be paid by customers who switch to another supplier is frequently called a transition charge. Stranded costs are temporary expenses that are included as a transition charge on your electric bill after deregulation during the transition period to a fully competitive market. Stranded costs are costs that cannot be fully recovered in a competitive market. As stranded costs are recovered, transition charges will be phased out. *See also Stranded Costs and Securitization.*

Transition Costs. See Stranded Costs and Transition Charge.

Transition Period
The time period, established by deregulation legislation, during which the incumbent utility, regulators, and consumers adapt to deregulated power markets. The duration of this transition is usually tied to the period of time the utility is allowed to make the financial adjustments and can recover stranded costs through transition charges. *See also Transition Charge, Stranded Costs.*

Transmission Charges
Power consumed by retail customers can be either generated nearby or wheeled (transported) over transmission lines. Transmission charges are levied for use of the transmission system. Prohibiting access to transmission lines prevents power buyers from shopping for more economical electricity supplies. FERC recognized that fact and in the 1990s adopted a series of orders that require utilities that own transmission lines to 1) separate electricity trading functions from the operation of transmission, 2) allow any wholesale power seller or buyer access to transmission lines the utility owns, and 3) price transmission access at a uniform rate (approved by FERC) for all users, including the utility owner. Thus, all transmission users are charged the same amount.

Transmission Grid. See Grid, Transmission System.

Transmission Line
Transmission lines carry power throughout the bulk power system. Transportation of electricity across transmission lines is called "wheeling." The distinction between transmission and distribution lines is fuzzy at best. However, only transmission lines are high-voltage lines. Distribution lines are lower voltage than transmission, but some transmission lines are also low voltage, especially those serving small, more isolated, customers. Transmission lines form a network, like the threads in a fabric, which provides multiple paths for power to flow through a large area or region. Most transmission transactions are wholesale transactions to distribution substations where voltage is reduced for use by retail customers. Transmission systems are planned and designed as an integrated system that includes specific roles for generation and loads. There are limits to how much power a transmission line can carry. As a result, plans assume that retail customers will take power out of the system and reduce the loading of transmission lines as they travel long distances. Rather than rely solely on long transmission

lines, power systems are designed so that power plants are scattered around the system. This reduces the need for more transmission lines (power that is needed by consumers can either be generated nearby or wheeled in over transmission lines). *See also Bulk Power Market, Grid.*

Transmission System. See Transmission Line.

Transparent Pricing
Implementation of price deregulation requires open markets and transparent pricing. Transparent prices are prices that can be readily determined by market participants. If two parties enter into a private buy-sell agreement, no one else knows the agreed upon price. Buyers and sellers set transparent prices in an open environment where other interested parties can monitor the prices offered.

Turbine Generator or Combustion Turbine (CT)
All modern power generators are steam driven. The steam turns the fan-like blades of a turbine and the spinning generates electricity. The current versions of gas-fired generators utilize a combustion turbine design that is derived from jet engines. In this design, the turbine includes a compressor element that concentrates the oxygen-fuel mix to increase combustion efficiency. Contemporary combustion turbines convert about 40% of their fuel into electricity in simple cycle mode. CTs can be designed to capture and reuse the waste heat from the simple cycle to generate additional power. This design is called a Combined Cycle Combustion Turbine, or CCCT. CTs can run on oil as well as natural gas. They can also burn gas, primarily methane, derived from the gasification of coal. These plants are called Integrated Gasification Combustion Turbines, or IGCTs.

Historically, natural gas and oil have been relatively expensive generating fuels. Deregulation of natural gas markets a decade ago resulted in significantly lower prices leading to the present popularity of CTs and CCCTs. These plants are comparatively inexpensive to construct, don't require large amounts of land, and produce comparatively low levels of air and water pollutants. Nevertheless, coal is an abundant and inexpensive fuel and IGCTs may become more common in the future. *See also Gas Turbines, Electric Generation.*

U

Unbundled Services
Prior to deregulation utility bills lumped, or bundled, all charges into a charge per kWh and kW. Some utilities called out fees for items they wanted to distinguish from utility service charges, such as taxes, franchise fees, and occasionally, conservation programs. The process of deregulation requires utilities to separate, or unbundle, charges for various elements of utility service. Specifically, they are required to identify the cost of power, transmission, and often metering and billing. Frequently, post-deregulation bills include line items for stranded cost recovery, securitization costs, and public benefits fees. The remaining charges may be lumped together as distribution charges, or separated into distribution, administration, and other operating expenses. Many states are planning to expand competition to include other elements on the unbundled utility bill, with metering and billing highest on the list.

Universal Service
Utility services are deemed necessities. (That is one justification for permitting utilities to have a monopoly.) Because regulators view utilities as a necessity, they have required utility providers to make their services available to anyone who requests service. This is called universal service. Obviously, if utility rates are too high, not everyone can afford utility service. As a result, most regulators require utilities to provide a minimal level of service for a cost that is affordable to most customers. Thus, universal service has come to mean not only access to utility services (the hook-up) but allowing some minimum level of consumption at a low cost.

Usage Charge. See Kilowatt Hour Charge.

Utility
A utility can be either a private or publicly owned company that provides a commodity or service that is considered vital to the general public, such as power, water, or gas for heating. Because utility services are considered necessities, utilities are allowed to operate as monopolies and prices and service conditions are regulated by the government or subject to review by citizens.

Utility Assets. See Capital Investments.

V

Value of Service Pricing. See Cost-of-Service Pricing.

Value-Added Services. See Demand Side Management**.**

Variable Price or Variable Rate
A price that can change (by the hour, day, month, etc.). The cost, and value, of generation changes on an hourly basis. Variable rates or prices capture these changing costs and are a more accurate reflection of power costs than traditional fixed-cost utility rates. Some utilities have rate schedules that vary to reflect changing market conditions. After deregulation, competitive prices will vary on an hourly basis and power prices are expected to follow suit.

W

Watt
This is a measure of the amount of electricity needed to power a device such as a light bulb. It is the primary unit of measure for electricity use. However, most electrical uses use many watts, so the most common unit of measure is 1,000 watts, or the kilowatt. Generating plants and very large customers use Megawatts (MW) as a measure. One Megawatt is equal to 1,000 kilowatts.

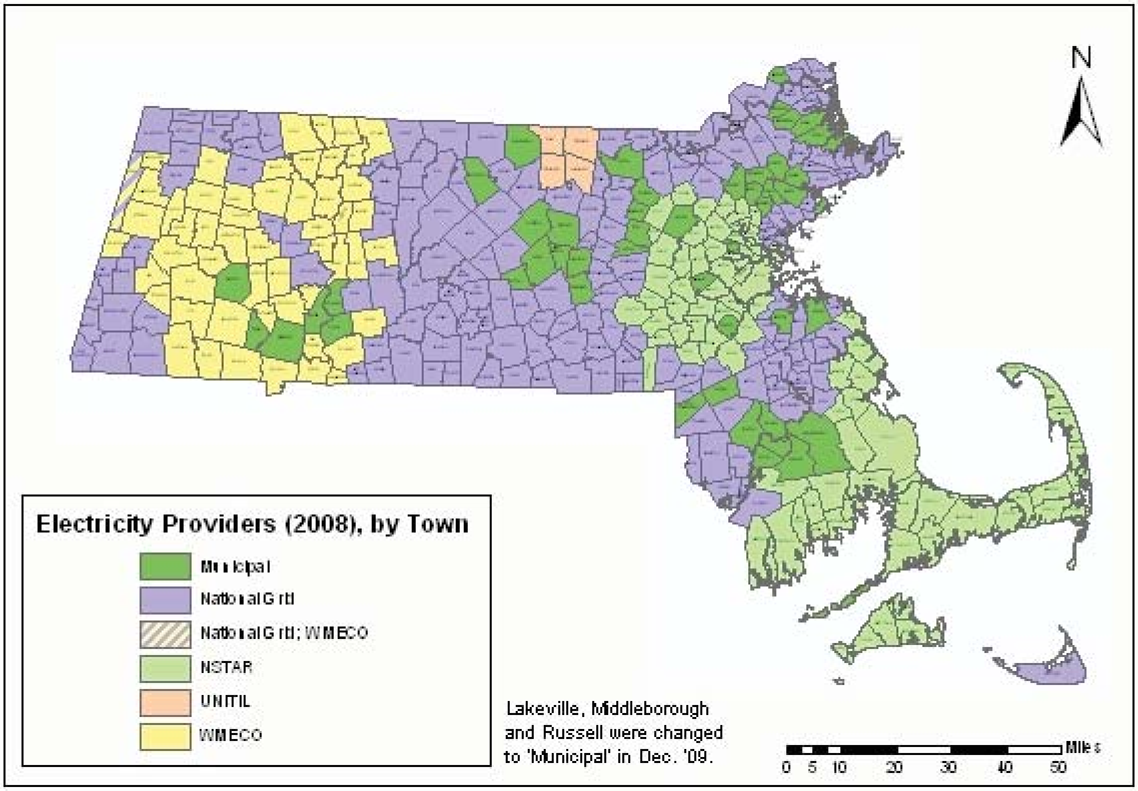
Wheeling
This is the process of transporting a utility commodity (electricity, natural gas, or water) across an area through wires or pipes without using it. When a utility wheels power across the transmission grid, its purpose is to get the power from one place to another, rather than to distribute the power to customers. The term is most often used to refer to the transportation of a commodity for a third party across another utility's system. For example, if utility A buys power from a power plant on the other side of neighboring utility B, it may request that utility B wheel the power across its system to utility A. Utility A expects to receive the amount of power on its end that it purchased from the power plant. In point of fact, the wheeling process consumes some natural gas or electricity. This consumption is called a loss. Electrical losses are due to line resistance. Natural gas losses are due to use of gas in the pipeline as fuel to run the compressors along the pipeline that force the gas to flow. Historically, electric utilities and pipeline companies have been unwilling to allow third parties to use their systems to move commodities purchased from other commodity producers. This stifled the development of fully competitive commodity markets and increased commodity prices. In the 1990s the FERC ordered both natural gas pipeline companies and electric utilities to wheel gas and power for wholesale buyers and sellers of those commodities. These orders resulted in increased competition in commodity markets, increased wheeling transactions, and lower commodity prices.

Wholesale
This is the sale of a commodity (such as electricity) in quantity for resale purposes. The distinction between wholesale and retail transactions is of interest primarily for regulatory purposes. Wholesale transactions often involve trade between parties in different states. As a result, wholesale transactions are considered interstate commerce and fall under the jurisdiction of the federal government, not the states. The primary regulator of wholesale transactions is FERC. In contrast, retail transactions occur within state boundaries and are the jurisdiction of state agencies. The exception for electricity is the state of Texas, which is electrically isolated from the rest of the country, so virtually all wholesale transactions occur within the state. Accordingly, the state of Texas retains jurisdiction. Similarly, natural gas that is produced and transported wholly within a gas-producing state is also exempt from FERC jurisdiction. There are several states that have intra-state (as opposed to interstate) gas pipelines. FERC took the lead in deregulating both the natural gas and electricity markets. This resulted in some very large natural gas customers, called non-core customers, gaining direct access to wholesale gas markets. Many industrial firms would like similar access to wholesale electricity markets, but those desires have been frustrated by FERC to date. Some large customers can become true wholesale customers through petitions to FERC or local regulators. However, the standards are very strict. Generally, the customer must own and operate a distribution system similar to a retail utility and use that system to resell utility services to third parties for a fee that includes distribution charges, just like a utility. Customers with wholesale status are able to avoid paying some fees that may be levied by state regulators. *See also Bulk Power Market.*

Wind Power
This is the use of wind to spin a turbine to generate electricity. Wind as slow as 5 mph can produce electricity. Isolated wind turbines were common in rural areas, especially in the Great Plains states, in the 1930s and '40s. Wind power today is a large-scale affair with multiple turbines being located in a wind farm. Wind farms produce power on a similar scale to conventional generating plants, namely 10s of megawatts. Although wind power is pollution free, the wind blows intermittently. Wind conditions are only right for wind power 30 to 40% of the time. Nevertheless, wind power is the most rapidly developing new power resource. The costs of wind power have declined significantly over the last decade, although not as fast as those of conventional generation. Still, wind power today is cheaper than power from nuclear plants was in the early 1980s.

Wires Charge
A broad term that refers to charges levied on power suppliers or their customers for the use of transmission or distribution wires to deliver electricity. Transmission and distribution use fees are obvious wires charges. However, regulators use the wires charge mechanism to collect a variety of other fees not directly related to power delivery, including stranded costs, payments for securitized debt, taxes, and franchise fees, as well as for funding low-income and public benefits programs. *See also Access Charge.*

Appendix 4


N
Electricity Providers (2008), by Town
Municipal
National Grid
National Grid; WMECO
NSTAR
UNITIL
WMECO
Lakeville, Middleborough and Russell were changed to 'Municipal' in Dec. '09.
Miles
0 5 10 20 30 40 50

Appendix 5

Electricity *Explained*

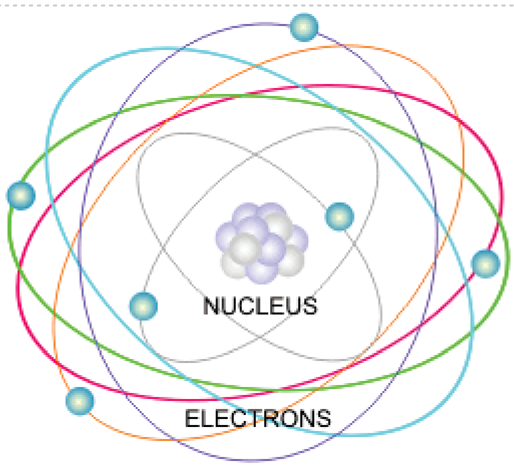
The Science of Electricity – Basics

Everything Is Made of Atoms

In order to understand electricity, we need to know something about atoms. Everything in the universe is made of atoms — every star, every tree, every animal. The human body is made of atoms. Air and water are, too. Atoms are the building blocks of the universe. Atoms are so small that millions of them would fit on the head of a pin.

Atoms Are Made of Even Smaller Particles

The center of an atom is called the **nucleus**. It is made of particles called **protons** and **neutrons**. The protons and neutrons are very small, but electrons are much, much smaller. **Electrons** spin around the nucleus in shells a great distance from the nucleus. If the nucleus were the size of a tennis ball, the atom would be the size of the Empire State Building. Atoms are mostly empty space.



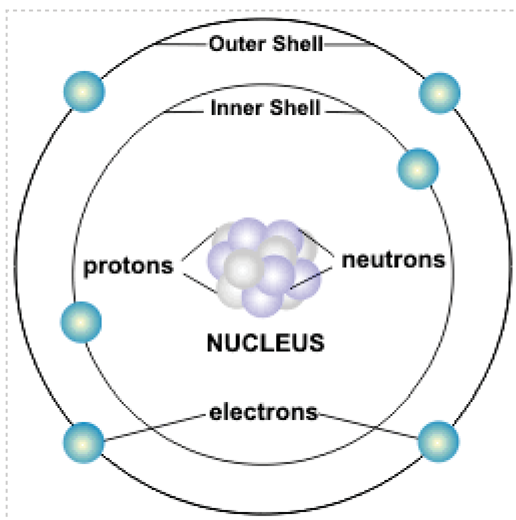
If you could see an atom, it would look a little like a tiny center of balls surrounded by giant invisible bubbles (or shells). The electrons would be on the surface of the bubbles, constantly spinning and moving to stay as far away from each other as possible. Electrons are held in their shells by an electrical force.

The protons and electrons of an atom are attracted to each other. They both carry an **electrical charge**. Protons have a positive charge (+) and electrons have a negative charge (-). The positive charge of the protons is equal to the negative charge of the electrons. Opposite charges attract each other. An atom is in balance when it has an equal number of protons and electrons. The neutrons carry no charge and their number can vary.

The number of protons in an atom determines the kind of atom, or **element**, it is. An element is a substance consisting of one type of atom (the Periodic Table shows all the known elements), all with the same number of protons. Every atom of hydrogen, for example, has one proton, and every atom of carbon has six protons. The number of protons determines which element it is.

Electricity Is the Movement of Electrons Between Atoms

Electrons usually remain a constant distance from the nucleus in precise **shells**. The shell closest to the nucleus can hold two electrons. The next shell can hold up to eight. The outer shells can hold even more. Some atoms with many protons can have as many as seven shells with electrons in them.



The electrons in the shells closest to the nucleus have a strong force of attraction to the protons. Sometimes, the electrons in an atom's outermost shells do not. These electrons can be pushed out of their orbits. Applying a force can make them move from one atom to another. These moving electrons are electricity.

Static Electricity Exists in Nature

Lightning is a form of electricity. It is electrons moving from one cloud to another or jumping from a cloud to the ground. Have you ever felt a shock when you touched an object after walking across a carpet? A

stream of electrons jumped to you from that object. This is called **static electricity**.

Have you ever made your hair stand straight up by rubbing a balloon on it? If so, you rubbed some electrons off the balloon. The electrons moved into your hair from the balloon. They tried to get far away from each other by moving to the ends of your hair. They pushed against each other and made your hair move — they repelled each other. Just as opposite charges attract each other, like charges repel each other.

Learn More

- Understanding Electricity (Smithsonian Institute) — http://americanhistory.si.edu/powering/

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U.S. Energy Information Administration
Independent Statistics and Analysis